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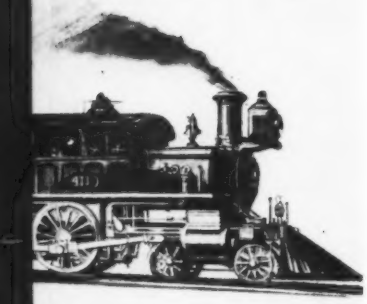

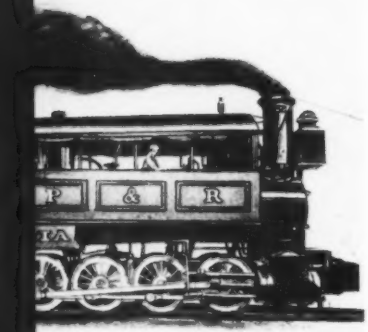

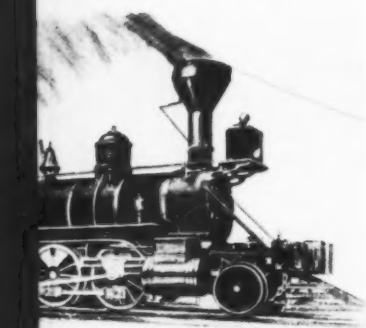

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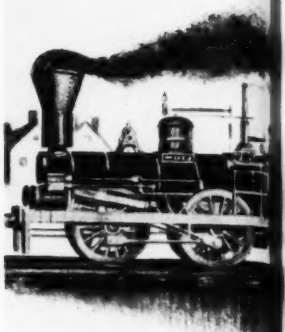

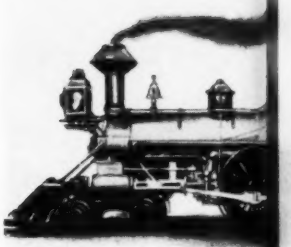

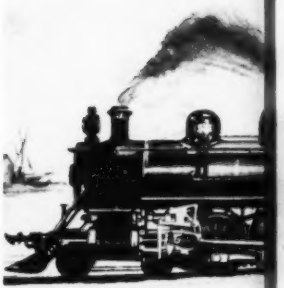

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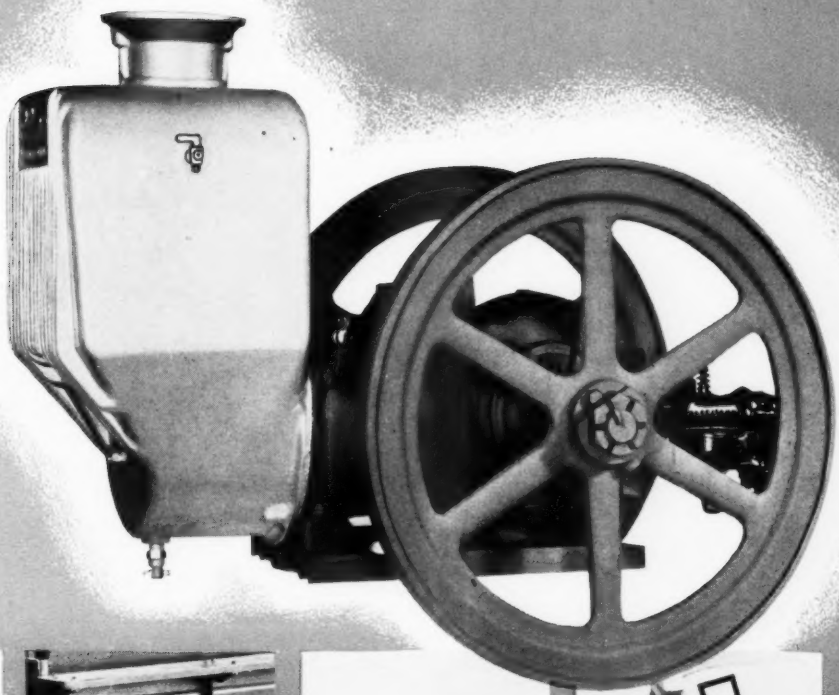
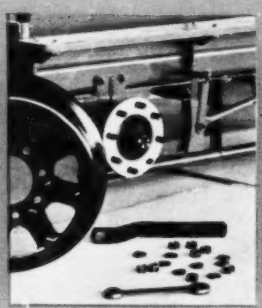
Designed for ECONOMY

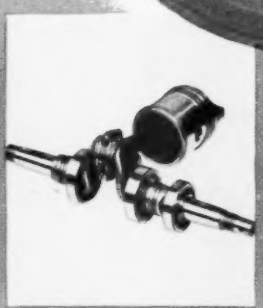


The efficient two-cycle engine on Fairmont inspection, section and light gang cars has many exclusive time-proven features that make for economical performance and maintenance.

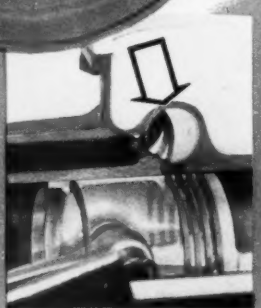
*The Fairmont Hy-Duty Timer is of the condenser type. It operates equally well in either direction at high and low speeds.



*Fairmont demountable wheels permit removal of worn tires without pulling the hub and effect substantial savings.



*Three bearings instead of two keep Fairmont crankshafts perfectly aligned and assure long and dependable service.



*Fairmont patented throttle valve permits running car as slow as a walk without causing the engine to miss; prevents fuel waste.

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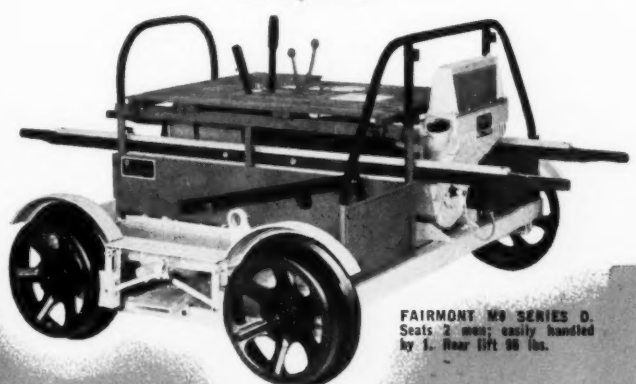

FAIRMONT M9 SERIES D. Seats 2 men; easily handled by 1. Rear lift 98 lbs.

THE above features are only a few examples of the way Fairmont designs motor cars for economical operation and maintenance. The policy, originated years ago by Fairmont, of standardizing fundamental dimensions of major parts so that they can be interchangeable on many models has also brought important savings to railroads by minimizing replacement stock. Why not make Fairmont economy available for your road? Fairmont Railway Motors, Inc., Fairmont, Minnesota.

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INTERNATIONAL Industrial Power

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NO-OX-ID prevents rail joints from "freezing" by preventing corrosion at the concealed and inaccessible surfaces, as indicated by arrows.

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For maximum protection, NO-OX-ID should be brushed on the portion of the rail behind the angle bar. In addition, the entire angle bar, track bolts, and bond wires should be fully coated. Application at the time the new rail is laid will prevent corrosion for years. NO-OX-ID can be applied cold.

NO-OX-ID provides both mechanical and chemical protection against rust. It works mechanically to exclude moisture and gases, and chemically to inhibit corrosion. NO-OX-ID's plastic coating will not crack or disintegrate.

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NO-OX-ID is also used for protecting bridge structures, expansion bearings, turntables, track scales, tanks, and pipe lines. Thorough cleaning of steel structures is not necessary. Merely brush off loose rust patches and apply NO-OX-ID. As old rust has been killed and falls off, touch up the bare spots. Then, one to three years later, a finishing coat of NO-OX-ID Filler can be applied for permanent protection. Write for Bulletin 3009.

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No. 145 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO, ILL.

Subject: A Year's Work

January 1, 1941

Dear Reader:

With this issue of Railway Engineering and Maintenance, we are enclosing an index of the twelve issues published in 1940. We are doing this because we know that many of you bind your copies and that an even larger number of you preserve your copies loose but carefully stacked in order that you may have them available for reference as the need arises. We know also from our own daily experience how greatly an index aids one in locating an article.

This index, incidentally, illustrates a basic difference between popular magazines and business papers. The one is read primarily for relaxation and general information; the other for aid in one's work. As a result, few of you keep your popular magazines while I know that many of you keep complete files of your business magazines. It is because of this fact that we have prepared and are sending this index to you. We hope that you will find it of interest and help.

As you look through this index, I am sure that you will be impressed with the volume as well as the variety of the information that has been published during the last year. The general index, for illustration, contains nearly 700 references (including cross references) to 107 articles and 200 items of news. During the year nearly 800 items were published, recording the promotion, transfer, retirement and death of railway officers in charge of maintenance of way activities. And the names of 127 authors are listed, who co-operated with our staff in the preparation of the editorial contents. Similarly, there are recorded the advertisements of 87 manufacturers who used the pages of Railway Engineering and Maintenance to keep their products before you.

It has long been recognized that the alert, well-edited business paper mirrors the progress in the field that it serves. The railway industry, and especially that branch dealing with the maintenance of roadway and structures, is now in the throes of a very broad and far-reaching transition, in which old methods and old materials are giving way to newer and more efficient practices with startling rapidity. Such a period calls for more than usual activity on the part of the business paper if its readers are to be informed about and kept abreast of these new developments.

This index affords opportunity for you to check the completeness of our coverage of the year's developments. It may also impress on you how essential Railway Engineering and Maintenance is to the alert railway officer who desires to keep abreast of the progress in the field of railway maintenance in these days of kaleidoscopic change.

All in all, I am sure that you will agree with me that 1940 was a great year. Let's all join together in making 1941 a year of even greater progress.

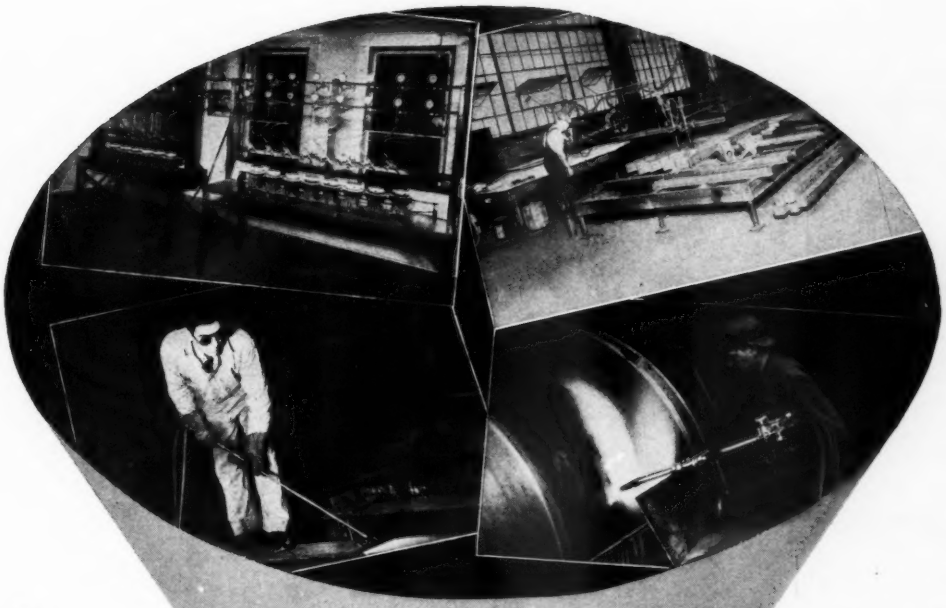
Our entire staff joins in wishing you a Happy New Year.

Yours sincerely,

Elmer T. Howson

ETH:KR

Editor



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JANUARY, 1941

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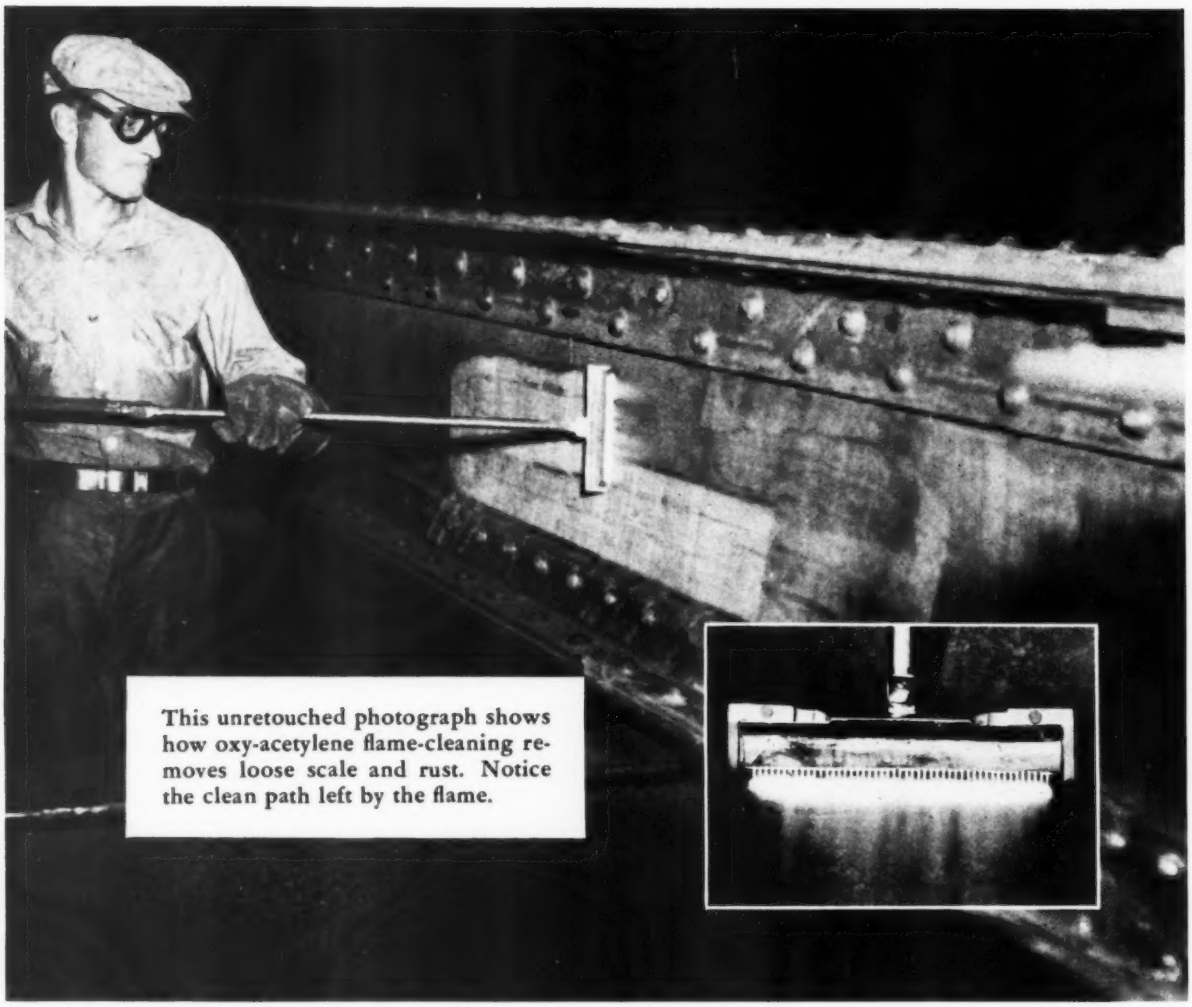

This unretouched photograph shows how oxy-acetylene flame-cleaning removes loose scale and rust. Notice the clean path left by the flame.

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Railway Engineering and Maintenance

1940

A Year of Progress

THE year that has just closed was one of definite progress in recovery from the depths of 1933-34 and from the renewed lapse in 1938. It consolidated and enlarged the gains made in 1939. In other words, the railways are entering 1941 on a definitely higher plane of activity and of efficiency than prevailed a year ago and markedly higher than prevailed two years ago. This improvement is evidenced by the higher volume of traffic; by the improvement in net earnings, and by the larger program of roadway repair and rehabilitation that prevailed during 1940—it is evidenced equally by the outlook for still further improvement in all these respects in 1941.

In contrast with the violent fluctuations in traffic that characterized railway operations in 1939, evidenced by the near-record rise in car loadings that followed the outbreak of the European war in September and the equally precipitate decline in the closing weeks of that year, the year 1940 was one of normal seasonal trends in loadings. Although the trend was slightly upward throughout most of the year, and the traffic handled was 7.2 per cent larger than in 1939, measured in cars loaded, and 11.0 per cent higher, measure in ton miles, the peak traffic (in the week ending October 26) was only 837,651 cars, or 2.2 per cent less than the maximum of 856,289 cars loaded in the week ending October 19, 1939.

A Summary of the Year's Operations

Looking back over the year, the operations for 1940 may be summarized in the following figures, prepared by Dr. Julius H. Parmelee, director of the Bureau of Railway Economics.

Revenue freight traffic, measured in ton miles, was 11.0 per cent larger than in 1939. It exceeded that for any year since 1930.

Revenue passenger traffic (passenger miles) increased 4.6 per cent over 1939 and was likewise heavier than in any year since 1930, except 1937.

Operating revenues increased 7.0 per cent over 1939; freight revenues increased 8.3 per cent, while passenger revenues declined 0.5 per cent.

Railway taxes totaled $405,000,000, or more than $1,100,000 a day, an increase of nearly $50,000,000, or 13.9 per cent over 1939. This was the largest tax bill in the history of the railways. It took 9.5 cents of each dollar of operating revenues.

Net railway operating income approximated $650,000,000, an increase of 10.4 per cent over 1939, and the largest, with the exception of 1936, since the year 1930.

Purchases of materials, supplies and fuel, but excluding equipment, by the Class I railways approximated $850,601,000, or 10.5 per cent more than in 1939. Purchases from manufacturers of materials and supplies, excluding fuel but including equipment, aggregated $812,502,000. Total purchases for rail transportation in 1940, including those made by private car lines and by contractors for railway application, approximated $1,132,845,000.

Capital expenditures in 1940 approximated $400,000,000, an increase of 50 per cent over the $262,029,000 expended for this purpose in 1939.

Indices of Operating Efficiency

Based on figures for the first ten months of 1940, the railways maintained the remarkable records of operating efficiency that they have established in recent years and raised them to new high levels in several respects, making the performance for 1940 the best in railway history.

The average speed of freight trains maintained the record high level established in 1939, of 16.7 miles per hour. The average freight train speed has increased 5.6 miles per hour, or more than 50 per cent, since 1922.

The average movement per "active" freight car per day (excluding surplus cars) was 42.4 miles, as compared with 41.2 miles in 1939.

The average load per freight train was 850 tons, the highest in railroad history. It compares with 807 tons in 1939 and a previous high record of 804 tons in 1929.

The average load per freight car was 27.7 tons, as compared with 26.7 tons in 1939.

The gross ton miles per freight train hour exceeded all previous records for the eighth consecutive year, the 1940 figure being more than twice as great as that for 1921. The 1940 figure was 33,856; it was 32,808 in 1939.

Freight locomotive fuel consumption again established a new low record, averaging 111 lb. per 1,000 gross ton miles, as compared with 112 lb. in 1939.

Speed the Slogan

The year was characterized by outstanding developments in both passenger and freight service. In the former, more new streamlined trains were placed in service than in any previous year, while the number still on order at the end of the year likewise broke all records. A total of 24 new lightweight streamlined trains began operation in 1940, bringing the total now in service in the United States to approximately 100, while 17 more are under construction and still undelivered. Some of these trains comprised amplifications of existing services; more of them opened up new routes, such as the Denver-Dallas

service of the Burlington, the Chicago-Phoenix service of the Rock Island and the three-train pooled service of the three leading routes in the Chicago-Florida service. These streamlined trains are now traveling more than 50,000 miles daily, largely on schedules requiring cruising speeds of 75 to 90 miles per hour. And these new trains are merely the flagships for a vast fleet of trains which, with their new and modernized, air-conditioned equipment are providing a service that, in comfort as well as in speed, was unthought of as recently as a decade ago. The last year witnessed the greatest development in this service that has yet been recorded.

And the modernization of freight service, although less spectacular, is proceeding with equal rapidity. The reduction of 24 hr. in freight schedules between important centers occurred so frequently during the last year as to become almost commonplace. In fact, the service offered shippers not only equals that of passenger trains in speed but their shipments are actually being handled in passenger trains with increasing frequency.

Speeds such as these are of very direct concern to the maintenance officer, for they not only intensify the destructive effect of moving trains on tracks and structures but they make necessary a standard of maintenance, as regards riding qualities, that would have been condemned as grossly extravagant only a few years ago. The last year saw the mileage of lines subjected to this service increase greatly. That they have withstood so well and so safely the very exacting demands constitutes a glowing tribute to the efficiency with which maintenance forces have risen to these new conditions—conditions that are destined to become universal, so far as main lines are concerned, within a very few years.

Construction—Abandonments

Construction activities, as measured by the building of new lines, declined to an almost all-time low in 1940, only 26 miles of lines being built. With the single exception of 1933, when only 24 miles were completed, this is a low record since these statistics were first compiled in 1830. It compares with a maximum mileage of 6,026 built in the United States in 1902. The 1940 mileage was divided between 5 projects, the longest of which was 8.71 miles. Two miles of new lines were completed in Canada during the year.

The major construction activity involving the railways during the last year was the building of many grade separation structures, again made possible by public funds. Within the last three or four years, more than 2,800 crossings have been eliminated and protective measures installed at 2,800 more, at an outlay of $280,000,000 of federal funds alone.

A total of 25.92 miles of second track was built in the United States last year, 23.42 miles of which was in one project of the Santa Fe in Arizona.

Less mileage of lines was abandoned last year than in any year since 1931, with the single exception of 1937. The mileage abandoned in 1940 aggregated 1,299, as compared with 1,783 in 1939, 1,897 in 1938 and 1,140 in 1937. During the 24 years beginning with 1917, a total of 25,191 miles of lines have been abandoned, while only 10,556 miles of new lines have been built.

More Money for Maintenance

Especially gratifying to maintenance officers was the growing liberality in allotments during the year. As the earnings of the railways improved, the management immediately returned a large part of these earnings to the properties to make good the heavier current wear and tear and to take up accumulated deferred work. This increase was reflected month by month and brought the total for the year to an estimated $510,000,000. This was the largest expenditure for this purpose since 1931 and exceeded that for 1939 by about 8 per cent, while it was 21 per cent larger than in 1938.

Maintenance Expenditures 1917-1939

1917	$ 442,108,862	1929	$ 855,354,867
1918	649,794,953	1930	705,470,940
1919	772,186,045	1931	530,612,890
1920	1,032,540,381	1932	351,179,041
1921	756,413,690	1933	322,335,022
1922	728,663,534	1934	365,285,353
1923	813,688,760	1935	393,642,261
1924	792,678,023	1936	454,842,407
1925	816,443,205	1937	495,593,913
1926	866,819,365	1938	420,147,125
1927	868,581,432	1939	466,830,844
1928	837,905,747	1940*	510,000,000

*Last two months estimated

As in the years immediately preceding, first consideration was given to those tasks that affect safety of travel most directly. In general, these requirements were little greater than in 1939, with the result that more money was available for work that did not affect safety so directly. Because of the vast accumulation of deferred work of this character, little evidence of reduction is evident as yet, but many roads made a very definite start last year and as opportunity continues, they will strive to bring their properties back gradually to their condition in 1929.

In making any estimate of the amount of deferred maintenance of tracks and structures that now exists, railway officers are divided between two extremes—one maintaining that there is little or no accumulated maintenance today and the other contending that the total runs as large as a couple billion dollars. Unfortunately, there is no one conclusive basis for evaluating the influences of higher speeds and their correlated higher standards of maintenance, of fluctuations in traffic and resulting wear and tear, of the changing efficiency of labor in times of depression and of activity, of the growing use of power equipment, etc. In spite of the more liberal expenditures made during 1940 and the probability that these expenditures may have been sufficient to make good current wear and tear on the property now being used, we see no reason to change the conclusion expressed in this annual review during each of the last four years that there still remains an accumulated deficiency in maintenance of approximately a billion dollars.

Rail and Tie Renewals

Aside from comparisons of the dollar expenditures, some light is shed on the adequacy of maintenance activities by a study of rail and tie renewals. Last year, it is estimated that the railways laid approximately one million tons of rails in replacement, which amount is larger than the tonnage laid in any year since 1930, with the single exception of 1937 and even this total may be exceeded. Large as this tonnage is, especially as compared with the tonnages for the preceding nine years, it is less than half that laid during the years preceding 1930. It is doubtful if last year's renewals made good the loss in service life imposed by traffic within that year, without taking up any of the deficiency in renewals that accumulated during the years immediately preceding. In our review of last year we expressed the conclusion that there still remained a deficiency in rail renewals of some 3,000,000 tons. We see no reason now to change this conclusion.

And the continuation of this deficiency is becoming increasingly serious, for as this rail is left in track beyond its normal service life, the hazard and frequency of failure increase. This is borne out by the steady increase in the number of transverse fissure failures reported by the Rail Committee of the American Railway Engineering Association in recent years. It is borne out also by the experience of roads that are now facing the problem of maintaining abnormal mileages of old rail in tracks.

Rails Laid in Replacements, Class I Railroads

	Gross Tons		Gross Tons
1925	1,950,146	1933	403,254
1926	2,209,873	1934	631,093
1927	2,124,765	1935	582,794
1928	2,080,277	1936	921,298
1929	1,958,489	1937	1,029,861
1930	1,517,002	1938	598,752
1931	984,900	1939	878,643
1932	394,536	1940*	1,000,000

*Estimated

As with rails, the number of crossties renewed last year increased, although the estimated total of 47,000,000 was only 2,000,000 more than were inserted in 1939. Here again it is difficult to determine the adequacy of renewals in recent years because of the effect of various conflicting influences but it is doubtful if the renewals last year made good the normal deterioration in all tracks in service. It is still our opinion that the railways are deficient to the extent of at least 90,000,000 ties in bringing their tracks back to 1929 condition. That a deficiency of this degree is not to be found in the main tracks of the country is conceded but it is to be found primarily in branch line tracks and sidings and especially in those yard and side tracks that have been taken out of service during the depression but that will have to be restored as the recovery of traffic now taking place, continues to develop.

Crossties Applied in Renewals, Class I Roads

1925	82,716,674	1933	37,295,716
1926	80,745,509	1934	43,306,205
1927	78,340,182	1935	44,351,900
1928	77,370,491	1936	47,361,015
1929	74,679,375	1937	47,729,538
1930	63,353,828	1938	41,363,224
1931	51,501,659	1939	45,088,278
1932	39,190,473	1940*	47,000,000

*Estimated

More Work Equipment

A development of special interest during the year has been the acceleration in the utilization of work equipment for maintenance work. This has been prompted in part by a growing realization of its economy and in part by the improvement of old and the development of new equipment. It has been hastened still more by the advance in wages made effective during the year on a number of railways, especially in the South, by the new legislation of the Wage and Hour division of the United States Department of Labor.

As set forth in detail in the article immediately following, both the number and variety of units purchased and the amount spent by the railways for this equipment reached new high levels in 1940. Thus the mechanization of maintenance of way operations made its greatest advance last year, opening the way for still further increases in efficiency.

A new development that arose late in 1940 and that will not come to a head until well into 1941 is the program of track construction involved in the National Defense program. This program, which involves the construction of munitions plants, the enlargement of arsenals and supply depots and the building of training camps, will require the construction of more tracks than have been built in any year since 1929. Single plants are requiring as much as 150 miles of tracks and 650 turnouts. Combined, it is estimated that these government projects alone will require the construction of more than 1,000 miles of tracks, perhaps twice that amount.

And to this must be added the industry tracks that must be built or extended to service the expanding activities of the airplane, steel and other industrial plants that are taking on the huge orders for war materials. While most of these government projects will be built by other than railway forces, these builders are calling on the railways for the skilled supervision necessary and also for many of the materials required.

What's Ahead in 1941

Looking to the year that is now opening, one sees much of encouragement. The railways are entering the year with freight traffic about 7 per cent above a year ago and such forecasts as can be made indicate that it will run from 7 to 10 per cent above the previous year through 1940. Even more certain is the fact that speeds will increase, adding further to the necessity for the maintenance of the tracks and structures to still higher standards.

With our country in the midst of a gigantic program for national defense, it is essential that the railways be so maintained that the country's materials and men may be moved without delay or interruption. Maintenance forces have made great strides in the improvement of their roadway and structures under the spur of providing the best service possible for civil traffic; to this is now added the further incentive of rendering essential service to one's country in a period of critical preparation for a possible emergency.

In looking into 1941, with its increased activities, the maintenance officer faces certain difficulties. First and foremost is that of materials. Already, the sudden launching of the government's program of track construction has exhausted the stocks of "spot" ties and threatens to develop competition for ties that will lead to the return of abuses that have long been characteristic of periods of insufficient tie supply. And it is to be expected that other "bottle necks" may appear as the defense program enlarges the demand for certain materials. With this development, railway officers may expect to pay higher prices for some commodities, and also face the possibility of delayed and irregular delivery.

The situation is equally threatening with respect to labor, especially skilled labor, in certain areas where contractors are offering wages for carpenters, masons, etc., that are so extravagant that they are draining men away from other industries. Already, railways in some areas are feeling this competition in their bridge and building gangs. It is to be expected that it will become worse.

Prepared for Service

In conclusion, the railways enter 1941 with a plant that is geared to meet any transportation demand that may be made on them. Not only is there already on hand an adequate supply of cars and locomotives to handle any traffic that may now be anticipated but new equipment is being added in liberal quantities. And the railways are being operated at new high levels of efficiency. They are ready and waiting to meet the nation's needs for transportation, civil and military.

1639 Motor Cars of All Types Were Purchased in 1940

Railways Spent $7,250,000

THAT there is still a large unfilled need for power machines and tools and that the railways are not only willing but eager to buy them to the limit of their resources was again demonstrated during 1940 by the fact that they purchased 5,414 units of work equipment at a cost of more than $7,250,000. Not only is this the largest number of units of work equipment ever purchased in a single year, but it becomes all the more striking when it is realized that it follows five years of relatively heavy purchases of similar equipment, and that it tops by more than 50 per cent the previous peak of 3,547 units purchased in 1939. Furthermore, although most roads have not yet completed their budgets for 1941, enough of them have done so to indicate that the purchases of this equipment during the coming year will compare favorably with those recorded for 1940. In fact, with only a few exceptions, the budgets that are now completed call for more units of equipment than were purchased last year.

Diversity of Types

While the magnitude of these figures is arresting, since they compare with 3,310 units in 1937, with 1,376 in 1938 and with 3,547 in 1939, the diversity of purchases is equally noteworthy for it presents a view of the extent to which the mechanization of maintenance of way work has developed during the last few years. Both the magnitude and the diversity of the work equipment purchases for the year also indicate a growing appreciation on the part of maintenance officers of the value of this equipment for the work of their department. Demonstrating the wide range of application of power machines, auxiliary equipment and tools to maintenance of way work, the list of units purchased in 1940 includes no fewer than 118 types, ranging from pile drivers, spreader-ditchers, locomotive cranes, snow plows and large ballast-cleaning equipment to small portable power tools.

One of the most interesting phases of a study of the list of machines and tools purchased during the year is the disclosure of the progress that has been made in the mechanization of the maintenance forces, not only during the entire quarter of a century since power machines adapted for maintenance of way work first became available, but even during the last decade, and particularly during the last half of this decade, despite the severe restrictions placed on all purchases by reason of reduced earnings. Such a study will reveal that only a few types were available 25 years ago and that of these not many had been designed for maximum efficiency. It will also reveal that a surprisingly large number of the machines and tools purchased last year were not available as recently as 10 years ago, while others that were available were not used or were used to only a limited extent. One of the striking facts that will be disclosed is that, with few exceptions the equipment that was available 10 years ago has been redesigned to insure greater efficiency, wider application or greater ease of operation.

More Roads Buy

In such a study one will also be impressed with the increasing number of roads that are purchasing work equipment. To obtain the information that is given in detail on the following pages, inquiry was made of all of the roads in the United States, Canada and Mexico as to their purchases of work equipment. Replies were received from 484 roads, including all but two of the Class I roads in the United States. Of this number 152 reported purchases of work equipment during the year and listed their purchases. This compares with 119 roads that made similar purchases in 1937, with 81 in 1938 and with 124 in 1939.

Included in the list of purchasers during the year are several roads whose officers have heretofore been unable to find any economy in the use of work equipment, except motor cars, while several have said that they do no work for which power machines are adapted. Others have said, in some cases rather decidedly, that they had all of the equipment that they needed or could use to advantage. The advance in wages that was granted maintenance of way employees a little more than a year ago, together with the added burden imposed by the raising of the minimum wage, by the Wage and Hour division, Department of Labor, is not only changing the viewpoint of many of these officers with reference to the use of work equipment, but it is bringing into the picture certain types of power machines and tools which many officers have believed could not be justified economically. In fact, it is making the use of all types of work equipment more attractive.

Probably no feature of the situation with respect to work equipment stands out in bolder relief than the fact that, despite the astonishing expansion that has been and still is taking place in the use of work equipment, and despite the large number of units that have been purchased during the last five years, no road has all of the equipment that it needs and most roads fall far short of meeting these needs. It is an interesting fact that a number of roads whose officers said no longer than six years ago that they had reached the saturation point for all types of work equipment, have

for Work Equipment in 1940

All-Time Peak Established by the Purchase of 5,414 Units of 118 Different Types During the Year. Many More Power Machines and Tools on Budget for 1941.

been among the large purchasers of this equipment during the last two years, and several of them have indicated that they will be in the market again in 1941 with a list comparable to that purchased last year.

In other words, the large purchases made during the last five years provide no indication that the point of saturation in the use of work equipment impends. On the contrary, all data show that the use of this equipment is expanding and that it will continue to do so for some years to come, for even the most experienced and alert maintenance officers are only beginning to realize that the ultimate possibilities in the use of work equipment have not even been approached. As this realization becomes clearer, there will be a continuing expansion, even on those roads that are now employing the largest number of power machines and tools. As this expansion continues, there will be created a larger and more stabilized demand for the replacement of worn out and obsolete units.

Modern Designs Wanted

While there can be no dispute that the majority of the units purchased in 1940 were intended to be additions to the work equipment already in use, there are many indications that replacements of worn out and obsolete units was larger than for several years. In fact, several roads indicated definitely that this was so. Again, a study of the list also discloses that in comparison with previous years a greater number of the larger and more expensive machines were purchased last year. Yet, at the same time, and at the other extreme, there was a notable increase in the purchases of small portable power tools and of portable power plants.

As in past years, the information given indicated a definite trend toward modernization since, with only a few exceptions, the units purchased were the latest models, including two-stage air compressors, Diesel-powered tractors and the latest in earth-moving equipment. As before, the strongest indication of this trend toward modernization is found in motor cars. This type of equipment has not only been used longer than all but a few others, but its use is practically universal. Furthermore, as recently as five years ago, almost every road had a surplus of motor cars by reason of the reductions they were compelled to make in the maintenance forces.

Yet, largely as a corollary to these reductions, the section motor cars then in use became obsolete almost immediately because, being designed for 6 to 8-men gangs, they were unsuited for the smaller gangs that were being employed. Since then the purchases of motor cars have been relatively large, amounting last year to 1,639 units. While some of these cars were of the heavy-duty type, indicating a still further increase in the number of extra gangs, as might be expected, the majority was again light-section and inspection cars, which were purchased generally to replace the older and heavier cars that are no longer suitable for small section gangs or for inspection service. Despite these relatively large purchases, however, many of the older cars still remain in service, and these replacements may be expected to continue.

More Tie Tampers Bought

Probably the next outstanding indication of the trend toward modernization, which also illustrates the expansion that has been noted in the use of work equipment, and incidentally illustrates the efforts that manufacturers are making to meet the demands created by changing requirements in maintenance, is provided by tie-tamping equipment. This equipment was one of the earlier types developed and was originally intended for the use of the larger gangs. The benefits to be derived from its use were so apparent, however, that a demand arose for outfits that could be used by the regular section forces, and this demand was intensified as the larger gangs were abolished and the section forces were reduced.

As a result of these changing requirements, although the larger outfits are being purchased in about the same numbers as formerly, most of the expansion in the use of tie-tamp-

Tie Tamping Outfits, of a Variety of Types, Ranked High Among the 1940 Purchases

Cranes Are Indispensable to Many Classes of Maintenance Work

ing equipment has occurred in the smaller units that can be justified for the smaller gangs. Also indicating the increased activity in track maintenance that was in evidence during the year, in 1940, the railways purchased 643 complete tie-tamping outfits (large and small), including both pneumatic and electric-driven equipment, and 330 tie-tamping tools.

In addition to the power plants included with these outfits and with the welding equipment that was purchased, 63 air compressors and 65 generators were purchased separately. While a few of them were intended to replace worn-out and obsolete power plants in existing equipment, most of them were for additions and were intended primarily for the operation of small tools.

Small Tools Increase

In general, small portable tools were a late development in work equipment, particularly those adapted for bridge and building work, and even after they became available, the roads as a whole were slow to adopt them. That this reluctance has given way under the pressure of economic necessity is evident from the magnitude of the purchases of this type of equipment in 1940. While it is not possible to state with exactness the number of units purchased, for some roads reported them by groups or as incidental to other equipment, a total of 751 units, more than twice as many as in 1939, were reported, including power saws, wood borers, wood and metal drills, hammers, grinders, wrenches, chipping and scaling tools, rotary brushes, spades, etc.

As a result of the marked recession in all railway construction, little interest in earth-moving equipment has been shown by the railways since 1929, except that adapted for ditching. Last year, however, considerable interest in this direction was noted, as indicated by the purchase of such equipment. That this interest is still increasing is shown by the purchase of 92 earth-moving units in 1940, including 16 power shovels, 6 combination cranes and shovels, 7 draglines, 7 carryalls, 20 angle dozers and bulldozers, 17 clamshell and dragline buckets, 1 spreader-ditcher and other miscellaneous units. It is also of interest that, except for the spreader, none of the earth-moving equipment was fitted with rail mountings.

The tractor represents another type of equipment that came into favor slowly. While this equipment had been used to some extent for several years, less than 10 years ago the railways owned only 12 of these machines, several of which were being employed by the stores and mechanical departments, and as late as 1939 only 22 units were purchased for maintenance purposes, not including those for mounting air compressors and welding generators. In 1940, however, purchases jumped to 90 tractors, the largest number ever purchased in a single year. To increase the range of their usefulness, 34 units of incidental equipment were purchased, some of which were mentioned in connection with earth-moving equipment.

These tractors do not include certain units of this equipment designed primarily for mowing, in which the mower is an integral part of the tractor, nor do the auxiliary devices for tractors include mowing machines. Indicating a continuation of the movement looking to improved appearance of the right of way and to cleaner ballast, the railways purchased 116 weed-destroying units in 1940, including tractor-mowers, mowing machines, power scythes, discers, scarifiers, weed burners, chemical sprayers, etc.

Maintenance officers have reported for a number of years that they were in need of more cranes of all types than they possessed, and that those they did own were obsolete and many were near the end of their service life, but for some reason relatively few have been purchased compared with the expressed need for them. Last year, however, 43 cranes were purchased, more than twice as many as in 1939, till then the year of largest purchases since 1929. It is significant that, except rail cranes, all of the units purchased last year were on crawler mountings.

That the trend toward increased use of highway vehicles is gaining momentum, is evidenced by the magnitude of the purchases of this equipment in 1940. While motor trucks have been used in congested terminals to a limited extent for more than 15 years, it is only within the last four or five years that maintenance officers have been persuaded of their value for use out on the line. As an indication of this change in viewpoint and as a further indication of the economic value of these vehicles, 30 passenger automobiles, 181 motor trucks and 25 highway trailers were purchased last year. As with many of the other types that have been mentioned, these figures represent the largest purchases of this equipment ever made in a single year.

The detailed list of all work equipment purchased in 1940 by all of the railways of the United States except the two Class I roads mentioned, and by most of the railways of Canada, follows:

United States

Akron, Canton & Youngstown—Northern Ohio
- 5 Motor cars, section
- 1 Motor car, inspection
- 1 Shovel, power and combination

Alabama, Tennessee & Northern
- 1 Dragline
- 1 Motor car, section

Alaska
- 4 Motor car engines
- 5 Push cars

Alton
- 1 Motor car, heavy duty
- 1 Motor car, inspection
- 3 Motor trailers

Alton & Southern
- 2 Motor trucks
- 2 Mowing machines
- 2 Rail and flange lubricators

Ann Arbor
- 1 Grinder, utility
- 2 Rail and flange lubricators

Atchison, Topeka & Santa Fe
- 2 Jacks, bridge
- 65 Motor cars, section and inspection
- 3 Mowing machines
- 1 Pile driver
- 1 Saw sharpener
- 2 Shovels, power
- 18 Rail and flange lubricators
- 4 Tie tamping outfits

Atlanta & St. Andrews Bay
- 1 Mowing machine
- 1 Pump, centrifugal

Atlanta & West Point
- 1 Air compressor
- 1 Bolt tightener
- 1 Scaler, lever type throttle
- 1 Shovel, power
- 1 Tie tamping outfit
- 12 Weed burners
- 1 Wood borer
- 1 Wrench, impact

Atlanta, Birmingham & Coast
- 2 Motor cars, section
- 1 Motor car, heavy duty
- 3 Push cars

Baltimore & Ohio
1 Grinder, power-portable gasoline operated
1 Motor truck

Bangor & Aroostook
1 Hammer, portable gasoline, heavy duty
6 Motor cars

Bellefonte Central
1 Automobile
1 Motor truck

Belt Railway of Chicago
1 Motor car

Bessemer & Lake Erie
1 Ballast cleaner
1 Bucket
1 Drill, heavy duty
1 Generator, portable
2 Jacks, power
6 Motor cars
6 Push cars and trailers
1 Saw, portable chain
1 Saw, portable circular
6 Tie tamping outfits

Bingham & Garfield
1 Bolt tightener
1 Motor car engine
1 Rail and flange lubricator
1 Spike driver

Boston & Maine
1 Automobile
1 Grinder, surface
1 Motor car, heavy duty
1 Motor car, inspection
1 Mowing machine
1 Rail and flange lubricator
2 Tie cutters
1 Tractor
1 Welding outfit
4 Wrenches, impact
1 Wrench, power

Buffalo Union-Carolina
1 Motor car, section

Burlington-Rock Island
1 Motor car, inspection
7 Motor cars, section

Butte, Anaconda & Pacific
1 Adzing machine
1 Motor car
1 Motor car, inspection
1 Motor truck
2 Rail and flange lubricators
1 Shovel, power
1 Spike puller
1 Tie cutter
1 Tractor, crawler mounted

Cambria & Indiana
1 Motor car, section
1 Motor truck
2 Push cars
1 Rail and flange lubricator

Carolina & Northwestern
1 Air compressor
1 Jackhamer
1 Motor car, heavy duty
3 Motor cars, section
1 Power shovel

Central Indiana
2 Motor cars, section

Central of Georgia
1 Bolt tightener
1 Grinder, rail
1 Motor car, heavy duty
6 motor cars, section
2 Mowing machines
1 Paint spraying outfit
1 Pump, portable
2 Rail and flange lubricators
2 Saws, portable, circular
2 Shovels, power
6 Tie tamping outfits
2 Wood borers
2 Wrenches, power

Central Railroad of New Jersey
1 Pump, portable centrifugal
2 Push cars
1 Rail and flange lubricator
2 Welding outfits

Charleston & Western Carolina
3 Push cars
1 Tie tamping outfit

Chattahoochee Valley
1 Motor car, section
1 Tie tamping outfit

Chesapeake & Ohio
4 Air compressors
2 Bolt tighteners
3 Carts, concrete, pneumatic tires
4 Concrete mixers
2 Cranes, burro, track mounted
3 Drills, rock, pneumatic
1 Drill, rock, ball bearing
1 Drill, rock, air
8 Drills, tie boring
1 Grinder, rail end
1 Jackhamer
2 Magnets, lifting
5 Motor cars, heavy duty
22 Motor cars, inspection
38 Motor cars, section
6 Motor trucks
1 Mowing machine
3 Paving breakers, pneumatic
4 Pumps, portable
9 Rail and flange lubricators
1 Rivet cutter
1 Saw, portable
4 Tamping tools, pneumatic
4 Tie tamping outfits
1 Wrench

Chicago & Eastern Illinois
1 Air compressor
1 Concrete mixer, vibrator
1 Pump, portable
3 Saws, portable

Chicago & Illinois Midland
1 Generator, 60 cycle, 3 phase
4 Motor cars, heavy duty
1 Pump, portable

Chicago & North Western
1 Air compressor
1 Concrete mixer
1 Crane
1 Drill, bonding
2 Mowing machines
6 Rail and flange lubricators
1 Saw, portable power

Chicago & Western Indiana
1 Drill, rail
1 Generator, portable
1 Tractor

Chicago, Burlington & Quincy
1 Bolt tightener
4 Concrete buggies
1 Demolition tool
2 Dragline buckets
1 Grinder, surface
1 Grinder, rail and switchpoint
1 Hammer, sheet pile
2 Jacks
56 Motor cars, inspection
36 Motor cars, section
9 Mowing machines, track
1 Power ballasting machine
1 Power unit, flexible shaft
1 Riveter, jam
1 Scythe, motor
12 Tie tamping outfits
1 Weed mower, tractor type
1 Welding outfit

Chicago, Milwaukee, St. Paul & Pacific
1 Air compressor
6 Bolt tighteners
1 Drill, rail
30 Motor cars, heavy duty
42 Motor cars, inspection
108 Motor Cars, section
1 Mowing machine, tractor-mower
1 Mowing machine, sickle
1 Shovel, power with dragline and crane boom
1 Spreader
3 Tie tamping outfits, crawler
1 Tie tamping outfit, electric
20 Trailers, heavy duty
2 Welding outfits

Chicago, Rock Island & Pacific
1 Bolt tightener
1 Concrete mixer
1 Crane
1 Dragline
2 Drills
1 Generator, portable
1 Grader, blade
1 Grinder
1 Hammer, double acting pile driver
1 Loader, front end
7 Motor cars, heavy duty
42 Motor cars, light section
35 Motor cars, inspection
2 Motor trucks
1 Mowing machine
2 Paint spraying outfits
3 Pumps, portable
6 Rail and flange lubricators
1 Saw, portable
2 Tie cutters
2 Tie tamping outfits
1 Tractor
1 Welding outfit
2 Wrenches, impact

Grinding Units Are Available for a Wide Variety of Specific Operations

Power Wrenches Are Being Adopted Widely for Track Work

Chicago, St. Paul, Minneapolis & Omaha
- 2 Motor cars
- 1 Motor truck
- 4 Rail and flange lubricators
- 2 Tie cutters

Clinchfield
- 6 Motor cars
- 1 Motor car engine

Coudersport & Port Allegany
- 1 Motor car

Danville & Western
- 1 Air compressor
- 1 Jackhamer

Davenport, Rock Island & Northwestern
- 1 Motor car, inspection

Delaware & Hudson
- 1 Generator
- 1 Jackhamer
- 12 Motor cars, heavy duty
- 30 Motor cars, inspection
- 2 Motor cars, light section
- 1 Motor scythe, with snow plow attachment
- 2 Paving breakers, pneumatic
- 2 Pumps, portable centrifugal
- 7 Rail lubricators
- 1 Rail slotter
- 1 Welding outfit

Denver & Rio Grande Western
- 1 Bolt tightener
- 1 Concrete mixer
- 2 Draglines, combination with shovel
- 38 Floodlights
- 29 Motor cars
- 4 Motor trucks
- 1 Mowing machine
- 2 Power tools, sets
- 22 Rail and flange lubricators
- 1 Saw
- 2 Tie tamping outfits
- 2 Tractors
- 4 Trailers
- 2 Wood borers

Denver & Salt Lake
- 2 Motor cars, inspection
- 14 Rail and flange lubricators
- 1 Tractor, bulldozer

Detroit & Mackinac
- 1 Motor truck
- 1 Rail and flange lubricator

Detroit & Toledo Shore Line
- 4 Tie tamping outfits

Detroit, Toledo & Ironton
- 4 Motor cars, section

Donora Southern
- 1 Truck, crane

Duluth & Northeastern
- 1 Grinder

Duluth, Missabe & Iron Range
- 1 Air compressor
- 1 Concrete mixer
- 2 Jacks, power track
- 2 Motor cars, heavy duty
- 1 Motor car, light inspection
- 4 Motor cars, section
- 1 Pump, portable
- 2 Spike drivers
- 1 Spike puller
- 4 Tie tamping outfits

East Erie Commercial
- 1 Air compressor
- 1 Jack, pneumatic
- 1 Motor car, section
- 1 Push car
- 2 Tie pullers

East Jordan & Southern
- 1 Mowing machine

Elgin, Joliet & Eastern
- 1 Grinder, rail
- 2 Hoists, ratchet
- 1 Hoist, utility
- 4 Motor cars, inspection
- 12 Motor cars, heavy duty and section
- 2 Mowing machines
- 15 Push cars and trailers
- 4 Rail and flange lubricators
- 8 Tie pulling machines
- 4 Tie tamping outfits
- 1 Weed burner & sprayer

Erie
- 2 Air compressors
- 1 Crane
- 1 Cribbing machine
- 2 Drills
- 2 Grinders
- 5 Hammers, chipping
- 2 Hammers, scaling
- 2 Meters, tension
- 6 Motor cars, inspection
- 8 Motor trucks
- 1 Mowing machine
- 1 Paint spraying outfit
- 2 Pumps, portable
- 21 Push cars
- 10 Rail and flange lubricators
- 1 Saw, portable
- 2 Tie tamping outfits
- 1 Tractor
- 1 Wrench, impact
- 1 Wrench, power

Escanaba & Lake Superior
- 3 Motor cars, section

Etna & Montrose
- 1 Push car

Florida East Coast
- 10 Tie tamping outfits

Galveston Wharf
- 2 Automobiles
- 1 Crane
- 1 Grinder
- 2 Motor trucks
- 1 Motor scythe, gasoline operated
- 1 Pitch kettle, portable oil burning
- 1 Saw, portable

Genesee & Wyoming
- 1 Automobile
- 1 Snow plow

Georgia
- 1 Tie tamping outfit
- 6 Weed burners, hand type

Great Western
- 1 Air compressor
- 1 Drill, power vane rotary
- 2 Drills, rotary reversible
- 1 Drill, rotary, non-reversible
- 1 Grinder, rotary air
- 1 Grinder, bench
- 1 Hammer, chipping
- 2 Hammers, riveting
- 1 Paint sprayer
- 1 Power shovel, ditcher
- 2 Welding outfits
- 1 Wood boring machine

Green Bay & Western
- 2 Automobiles
- 1 Drill
- 4 Motor cars, heavy duty and section
- 2 Motor car engines
- 4 Push cars
- 1 Saw, portable

Great Northern
- 1 Air compressor
- 1 Angle dozer
- 5 Automobiles
- 4 Bolt tighteners
- 1 Carryall scraper
- 2 Concrete buggies
- 1 Concrete mixer
- 1 Discer, ballast comp.
- 1 Ballast cleaner
- 1 Drill, air operated portable
- 14 Drills, electric portable
- 6 Drills, rail
- 2 Generators, portable
- 1 Grinder, air operated portable
- 2 Grinders, electric bench, portable
- 2 Hammers, electric portable
- 2 Hammers, portable gas
- 2 Heat guns, electric
- 2 Hoists, air operated
- 1 Hoist, air operated utility
- 92 Motor cars, inspection, section and heavy duty
- 1 Motor car engine
- 11 Motor car trailers
- 15 Motor trucks
- 1 Motor scythe
- 1 Mowing machine
- 6 Paint sprayers
- 5 Pony cars with accessories
- 11 Pumps, portable, engine driven centrifugal
- 1 Pumpcrete
- 1 Rail inspection car
- 1 Rivet heating forge, portable
- 1 Saw, air operated circular
- 5 Saws, electric
- 2 Saws, chain
- 9 Spike drivers
- 3 Spike pullers
- 2 Surfacers, electric
- 6 Tie adzers
- 14 Tie cutters
- 24 Tie tamping outfits
- 1 Track barrow
- 1 Tractor
- 2 Weed burners
- 1 Weed scalder
- 1 Wood borer

Gulf Coast Lines
- 1 Bull grader
- 1 Dragline
- 6 Motor cars, section
- 6 Motor car engines
- 1 Power plant, portable electric
- 20 Tie tamping outfits

Houston Belt & Terminal
- 1 Drill, rail
- 1 Grinder
- 2 Motor cars

Illinois Central
2 Bolt tighteners
1 Concrete mixer
2 Cranes
2 Discers and scarifiers
3 Draglines and accessories
3 Drills, bonding
2 Grinders, utility
2 Grinders, surface
3 Motor cars, heavy duty
10 Motor cars, inspection
44 Motor cars, section
4 Mowing machines
2 Paint sprayers
5 Pumps, centrifugal portable
2 Rail and flange lubricators
4 Spike drivers
1 Spike puller
16 Tie tamping outfits
2 Tractors
1 Weed burner
1 Welding outfit

Illinois Terminal
1 Grinder
2 Motor cars, heavy duty
5 Motor cars, inspection
2 Motor cars, section
1 Motor truck

Indianapolis Union
1 Bolt tightener
1 Welding outfit

International-Great Northern
1 Adzing machine
1 Bull grader
6 Motor cars, section
2 Motor car engines
20 Tie tamping outfits

Interstate
1 Motor car, inspection
1 Motor car, section

Jacksonville Terminal
1 Crane, locomotive
1 Grinder, rail
1 Motor car
2 Pumps
3 Rail lubricators
2 Tie tampers

Kansas City Southern
1 Drill
13 Rail and flange lubricators

Kansas City Terminal
1 Crane

Kentucky & Indiana
4 Push cars
1 Wood borer
1 Wrench

Lake Champlain & Moriah
1 Motor car, section

Lake Erie, Franklin & Clarion
2 Motor cars, section
1 Push car

Lake Superior & Ishpeming
1 Motor car, inspection
1 Motor car, section

Lehigh & Hudson River
1 Motor car

Lehigh & New England
1 Paving breaker
1 Pile driver

Lehigh Valley
9 Air compressors
5 Grinders, portable track
34 Motor cars
7 Motor trucks
2 Mowing machines, heavy duty
3 Paint spraying outfits, gasoline driven
2 Portable pumps, gasoline driven centrifugal
1 Power ballaster
57 Rail and flange lubricators
24 Tie tamping outfits

Longview, Portland & Northern
1 Crane
1 Tractor

Los Angeles Junction
1 Motor car, inspection
1 Paint spraying outfit

Louisville & Nashville
4 Air compressors
1 Cement gun
3 Concrete mixers
2 Cranes, crawler
2 Cranes, track
1 Digging bucket
1 Discer
9 Drills, reversible, electric
9 Generators, portable
1 Grinding tool and saw
36 Motor cars, section
18 Motor cars, inspection
4 Motor cars, heavy duty
2 Mowing machines
100 Push cars and trailers
2 Saws, portable
6 Tie tamping outfits
1 Welding outfit
9 Wrenches, lag screw

Maine Central
2 Bolt tighteners
1 Crane
18 Motor cars, section
4 Motor cars, inspection
1 Motor car, heavy duty
1 Motor truck
1 Plow, snow
1 Pump, portable
2 Push cars
1 Rail and flange lubricator
8 Tie tamping outfits

Maryland & Pennsylvania
1 Motor car, section

Meridian & Bigbee River
1 Motor car, inspection
1 Push car

Middleton & Unionville
2 Motor cars

Minneapolis & St. Louis
1 Angledozer
1 Carryall scraper
12 Motor cars
1 Power jack
1 Power unit, 2 drums
5 Tie tamping outfits
1 Tractor, Diesel

Missouri & Arkansas
1 Power shovel

Missouri-Kansas-Texas
1 Drill

Missouri Pacific
1 Bucket, clamshell
1 Concrete breaker, gasoline
3 Concrete mixers
2 Drills, bonding
1 Driver, gasoline lag screw
3 Generators, portable
3 Grinders, and rail drills
1 Hammer, pile
16 Motor cars, heavy duty
72 Motor cars, inspection
21 Motor cars, section
5 Mowing machines, tractor
4 Mowing machines, scythes
6 Mowing machines, track
7 Pumps, portable
46 Rail and flange lubricators
1 Saw, portable electric
4 Scrapers, 2-wheel
89 Tie tamping outfits
60 Tractors
1 Weed burner
1 Welding outfit
2 Wood borers, portable, mechanical
2 Wood borers, electric

Missouri & Illinois
2 Motor cars, heavy duty
1 Motor car, inspection
3 Motor cars, section

Monongahela
1 Air compressor
2 Drills
1 Generator, portable
1 Saw, portable
12 Tie tamping outfits

Montana Western
1 Drill, rail
1 Motor car, inspection

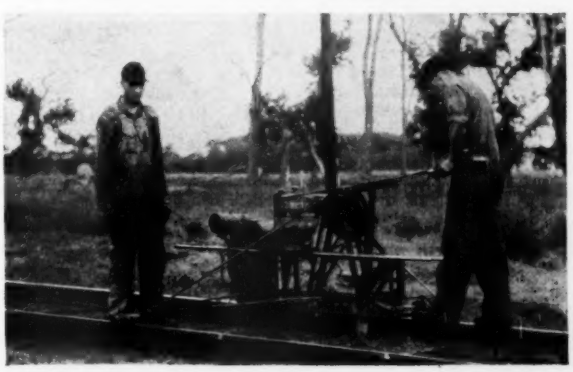
Nashville, Chattanooga & St. Louis
2 Motor cars, inspection
2 Pumps, portable

Nevada Northern
3 Rail and flange lubricators

Newburgh & South Shore
1 Rail and flange lubricator

New Orleans Public Belt
1 Air compressor
1 Drill, power
1 Power mower
2 Rail and flange lubricators

New York Central
16 Adzing machines
2 Air compressors
1 Air motor, propelling



Mechanical Aids for Tie Renewal Work Are Being Given Increased Attention

Power Spike Pullers Are Included in the Equipment of Many Rail Gangs

18 Bolt tighteners
1 Bulldozer
3 Cranes
8 Drills
6 Grinders
17 Motor cars
27 Motor cars, inspection
50 Motor cars, section
7 Motor cars, heavy duty
1 Motor car engine
7 Motor trucks
5 Motor trailers
4 Mowing machines
2 Paint spraying outfits
17 Rail and flange lubricators
14 Spike drivers
1 Spreader
40 Tampers, gas unit
12 Tie boring machines
80 Tie tamping outfits
1 Welding outfit
17 Wood borers
2 Wrenches

New York, Chicago & St. Louis
2 Drills
1 Generator
3 Grinders, rail
10 Motor cars, inspection
10 Motor cars, section
1 Paint spraying outfit
1 Saw, portable
5 Tie boring machines
3 Tie tamping outfits
5 Wrenches

New York, New Haven & Hartford
9 Air compressors
12 Drills, power rail
4 Drills, portable electric
1 Generator
13 Grinders
1 Motor car, heavy duty
5 Motor cars, inspection
67 Motor trucks
13 Motor cars, automobiles
1 Motor truck, trailer
1 Motor truck, scale test car
1 Preheater, oven-gas fuel
1 Pump, portable
48 pumps, hand operated gasoline centrifugal
35 Rail and flange lubricators
7 Saws, portable
5 Saws, electric chain
1 Saw, high speed hack
3 Spike pullers
10 Tie cutters
68 Tie tamping outfits
1 Welding outfit
1 Welding positioner
1 Wrench

New York, Ontario & Western
4 Tie Tamping outfits

New York, Susquehanna & Western
1 Air compressor
1 Motor car, inspection
1 Paint spraying outfit

Norfolk & Western
18 Adzing cutter heads
3 Adzing machines
10 Air compressors
10 Automobiles
3 Ballast cleaning machines
3 Bolt tighteners
5 Buckets, clamshell
3 Concrete mixers
6 Cranes
4 Drills
1 Drill core
2 Generators, portable power plants
13 Grinders
2 Hammers
2 Heaters, tar and asphalt
2 Heaters, concrete mixer water
5 Lift hoists
1 Lining transit
8 Motor cars, heavy duty
7 Motor cars, inspection
7 Motor cars, section
4 Motor trucks
1 Mowing machine
10 Paint spraying tanks
4 Power jacks
1 Pumpcrete machine
1 Pump, portable centrifugal water
43 Rail and flange lubricators
2 Rollers
1 Saw, portable electric
10 Scaling hammers
1 Shovel dipper assembly
4 Spike pullers
8 Tamping tools
25 Tie tamping outfits
1 Tapping machine
1 Tractor, Diesel
1 Welding outfit, electric
11 Wood borers
5 Wrenches, power vane
3 Wrenches

Norfolk Southern
1 Automobile
7 Push cars
5 Rail and flange lubricators

Northampton & Bath
1 Motor car, section

Northwestern Pacific
1 Air compressor, skid mounted
1 Bolt tightener, power
1 Concrete mixer
2 Drills, electric
2 Generators, portable
1 Jackhamer
1 Motor car
1 Shovel and dragline combination
1 Tractor, bulldozer, crawler

Oregon, California & Eastern
1 Motor car, inspection

Pacific Coast
1 Welding outfit, electric

Pennsylvania
3 Air compressors
5 Ballast cleaning machines
2 Bolt tighteners
1 Concrete breaker
1 Concrete vibrator
6 Cranes
2 Drills, electric, steel
5 Grinders
2 Hammers, electric
2 Jackhamers
4 Milling machines
10 Motor car engines and frames
9 Motor trucks
1 Mowing machine
1 Paint spraying outfit
1 Pole setter
8 Pumps, portable, water
1 Rail bender, hydraulic
3 Saws, electric
2 Spike drivers, pneumatic
246 Tie tamping tools
20 Tie borers
4 Wrenches, power

Peoria & Pekin Union
5 Motor car engines

Pere Marquette
1 Bolt tightener
1 Lifting magnet
28 Motor cars, inspection
12 Motor cars, section
4 Pumps, portable trench
6 Tie tampers
2 Tie tamping outfits
4 Trailers
2 Wood borers

Pittsburgh & West Virginia
2 Rail and flange lubricators

Pittsburgh, Lisbon & Western
1 Motor car engine
1 Paint spraying outfit

Pittsburg, Shawmut & Northern
1 Motor truck

Quanah, Acme & Pacific
1 Motor car, heavy duty

Reading
2 Bolt tighteners
1 Motor truck
25 Push cars
16 Tie tamping outfits

Richmond, Fredericksburg & Potomac
1 Crane
1 Motor car, heavy duty
1 Motor car, inspection
3 Motor cars, section
1 Tie tamping outfit

St. Louis-San Francisco
4 Bolt tighteners
1 Drill
10 Motor cars, inspection
1 Motor car engine
2 Mowing machines and power mowers
2 Paint spraying outfits
10 Rail and flange lubricators

St. Louis Southwestern
1 Angle dozer
1 Drill
1 Front-end loader
4 Motor cars
2 Motor trucks
1 Mowing machine
1 Tractor
1 Welding outfit

San Diego & Arizona Eastern
1 Shovel and dragline, combination
1 Tractor, bulldozer, crawler

San Francisco & Napa Valley
1 Motor car engines, section

Seaboard Air Line
3 Adzing machines
8 Bolt tighteners
2 Dragline buckets
24 Drills, portable electric
1 Floodlight
15 Generators, portable

7 Grinders
2 Motor cars, inspection
2 Motor trucks
2 Mowing machines
5 Pumps, portable
2 Power shovels
16 Rail and flange lubricators
1 Rail layer, power
18 Saws, portable, electric
4 Saws, chain
1 Scarifier
2 Spike pullers
48 Tie tamping outfits
3 Tractor, front end loaders and bull-dozers
2 Wrenches, impact
11 Wrenches, power

Southern
2 Air compressors
4 Angle dozers
2 Buckets, 1 clamshell and 1 dragline
1 Carryall
1 Concrete vibrator
36 Drills, portable, electric
19 Generators, portable
3 Grinders, rail, power
20 Grinders, portable, electric
4 Hammers, chipping, electric
86 Motor cars, section
38 Motor cars, heavy duty
53 Motor cars, inspection
19 Motor car engines
4 Motor trucks, trailers and automobiles
9 Paint spraying outfits
3 Power shovels, including combination
39 Rail and flange lubricators
21 Saws, portable, wood
3 Spike drivers
2 Spike pullers
17 Tie tamping outfits
5 Tractors
2 Weed burners
20 Wrenches, power

Southern Pacific
1 Air compressor
6 Bolt tighteners, power and pneumatic
4 Carryalls
2 Clamshell buckets
10 Clay spades, pneumatic
3 Concrete vibrators
6 Concrete mixers
1 Dragline bucket, digging
1 Gas engine, for welding machine
1 Jack, power track
39 Motor cars, inspection
19 Motor cars, section
10 Motor cars, heavy duty
4 Motor trucks, dump
2 Mowing machines, track
2 Paving breakers
1 Power shovel
4 Pumps, portable, power
50 Rail and flange lubricators
1 Rooter for tractors
2 Spike pullers, power
66 Tie tamping tools
15 Tie tamping outfits
6 Tractor-bulldozer, crawler
1 Welding outfit, electric motor driven
2 Wood borers

Southern Pacific Lines in Texas & Louisiana
1 Bulldozer
1 Drill
1 Grinder, drill
24 Motor cars, inspection
2 Motor cars, heavy duty
20 Motor cars, section
3 Motor trucks
21 Rail and flange lubricators
1 Portable saw, electric handsaw
2 Tool-holders-on, pneumatic
2 Tractors, crawler mounted
1 Welding machine
2 Wood boring motors
2 Wrenches

South Omaha Terminal
1 Welding Outfit

Spokane, Portland & Seattle
1 Adzing machine
1 Bolt tightener
1 Crane
1 Drill, rock
6 Drills, wood
24 Motor cars
3 Motor trucks
1 Mowing machine
1 Paint spraying outfit
6 Push cars
3 Tie cutters

Stockton Terminal & Eastern
1 Paint spraying outfit
1 Welding outfit, electric

Tennessee Central
1 Drill
2 Motor car engines
1 Mowing machine
1 Paint spraying outfit

Tennessee
1 Motor car, section
1 Push car

Texas & Pacific
1 Automobile
1 Concrete mixer
7 Motor cars, inspection
17 Motor cars, section
1 Spike puller

Terminal Railroad Association of St. Louis
1 Pump
1 Saw, portable
1 Welding outfit
1 Wrench, impact
1 Wrench, power

Toledo Terminal
1 Rail and flange lubricator
2 Tie tamping outfits

Tremont & Gulf
1 Motor car, inspection

Union Pacific
1 Derrick, truck
2 Drills, electric
6 Drills, hand bonding
4 Earth augers
2 Grinders, portable electric
77 Grinders, portable tool
1 Line marker
40 Motor cars
1 Motor car engine
1 Motor truck
1 Pile driver, heavy duty
1 Pile hammer
1 Pile hammer base
2 Pullers, rail and expander
1 Pump, centrifugal with gasoline engine
1 Rail and flange lubricator
4 Rail benders
1 Sawing machine, portable timber
1 Tie tamping outfit
5 Weed burner engines
2 Welding outfits, portable
2 Wood borers
1 Wrench

Union Railroad
2 Cranes
3 Motor cars
1 Power hack saw, portable
2 Push cars
1 Saw, rail

Union Railway
1 Grinder and rail drill

Union Terminal
1 Push car, section

Virginia Blue Ridge
1 Power shovel, steam
1 Rock crusher, portable
1 Tractor

Virginian
1 Air compressor, gasoline engine
1 Motor car, section
1 Rail layer, power
6 Rail and flange lubricators
1 Saw

Wabash
1 Adzing machine
1 Bolt tightener
1 Generator, portable
1 Grinder
5 Mowing machines
10 Rail and flange lubricators
1 Scarifier
32 Tie tamping outfits

Western Maryland
1 Generator, portable
1 Grinder
11 Motor cars, section
1 Motor truck
1 Saw, portable
4 Tie tamping outfits

Western Pacific
4 Motor cars, inspection
2 Motor cars, section
1 Motor truck
5 Rail and flange lubricators

Bridge and Building Gangs Are Being Equipped With Many Power Tools

Wheeling & Lake Erie
4 Motor cars
2 Pumps, portable centrifugal
24 Push cars, heavy duty

Canada

Canadian Pacific
4 Cranes, crawler
1 Drill, rail
2 Grinders
1 Motor car, heavy duty
1 Mowing machine
2 Saws, portable rail
2 Tie tamping outfits, heavy duty
1 Welding outfit, self propelled

Greater Winnipeg Water District
1 Dragline

(Continued on page 32)

Making Rail Joints Last Longer

By A. B. CHANEY
District Engineer, Missouri Pacific, Little Rock, Ark.

Building Up Rail Ends Is a Practice of Long Standing on the Missouri Pacific

A. B. CHANEY

In rail-joint maintenance there is a constant struggle to prevent or retard the deterioration of the rail ends and joint fastenings. In this paper, which was presented before the Maintenance of Way Club of Chicago, Mr. Chaney discusses the benefits of the end-hardening of rail by heat treatment to retard batter, and the rebuilding of rail ends and joint bars by welding, when they have become worn sufficiently to affect the riding qualities of the track.

THE subject of rail-joint maintenance covers a wide scope of requirements and methods. Even individual phases of the subject lead into many ramifications, and discussions of methods are sometimes complicated by the fact that practices that are strictly up to date today may be outmoded tomorrow, for changes and improvements are being made constantly in joint design and joint maintenance. Because of these many requirements, this discussion will be limited to the prevention of joint batter and the reconditioning of the rail and joint bars when batter and fishing wear have occurred.

According to the dictionary, a joint is a place, a point, a line or a surface where two or more things are joined together, or it is a place of low resort. I know more than one trackman who is willing to subscribe wholeheartedly to the implication contained in the last part of the definition and to assert that it fully describes most of the joints for which he is responsible. All trackmen are aware that too many joints are low and that too often they are battered.

What a Rail Joint Is

A rail joint consists of two rail ends, two joint bars, four or six bolts and an equal number of spring washers. Few items of maintenance expense exceed that caused either directly or indirectly by the rail joint. The cost of ties, rail, ballast, track fastenings and labor and, in addition, train operation, maintenance of equipment and many other items of expense are affected by rail joints, always adversely. Obviously, from the standpoint of this effort and expense, the ideal would be to reduce the number of joints by increasing the length of the rail or, better yet, to eliminate them by means of continuously welded rail.

Rail ends batter and joint bars wear on the areas of contact with the rail. The reasons for this are too well known to require discussion; the important question for consideration is the most effective and economical means of maintaining joints, as nearly as this may be possible, in the condition they were when the materials were new. So far, the best means yet discovered for rebuilding joints that are worn or battered is to restore the lost or displaced metal by welding.

Prolonging Rail Life

Before discussing welding as applied to joint maintenance, we will start with the laying of the rail and see what can be done at this time to enable it to resist batter and wear, and thus prolong its service life and increase the intervals between the rebuilding of the joints. It is becoming common practice to heat treat the ends of the rail to increase the hardness of the metal, and thus retard the development of rail-end batter, head flow and chipping. Some roads are having the end hardening done at the steel mill, while others do the heat treating in the track after the rail is laid. In giving the heat treatment, the heat is applied by either a gas flame or electric induction, either method being effective.

Heat treatment by electric induction has been developed for mill use, and the gas flame is used in both the mill and the field. The advantage of heat treatment at the mill lies in the fact that more uniform control is possible and the rail ends are treated before being placed in service, while it is seldom practicable to end-harden the rail in the field before some traffic has passed over it. The initial batter developed in field-treated rail is greater than in that that has been given heat treatment at the mill. An advantage of field treatment is that it is possible to harden all joints, including those at frogs, switches and cut rails which, obviously, cannot be done at the mill.

On our own road we have end hardened new 112 and 131-lb. rail in the field with the gas flame for sev-

eral years, at a cost slightly less than for mill treatment for these weights. The cost of this work averaged $0.28 a joint in 1939, divided between heat treatment $0.21 and grinding $0.07. End hardening of the rails is beneficial, even if it is not done for some time after the rail is placed in service, but it is better to do it as soon as possible after the rail is laid.

For end hardening the rails in the field, we use a gang of 11 men, including a foreman, organized as follows:

1 Foreman
1 Welder operating the heating equipment
1 Helper with the heating unit
1 Laborer with the heating unit
1 Laborer with push car, handling oxygen and acetylene tanks
1 Welder operating cross grinder
1 Laborer with cross grinder
1 Helper operating buffer or surface grinder
1 Laborer with buffer
2 Laborers flagging

11 Total

As the first operation, the rail ends are chamfered or slotted to a depth of ⅛ in. with the cross grinder. This is followed by the grinder or buffer to clean all mill scale and foreign matter from the rail head, the grinding being just deep enough to brighten the surface of the rail over the area to be treated, that is, across the full width of the head and about 2½ in. back from the end of the rail. The heat-treating machine is then placed over the rail joint, care being exercised to insure that an equal amount of the flame impinges on each rail end.

Inside flame tips are placed ½ in. from the end of the rail, to insure that the heat will penetrate uniformly below the surface, without melting any of the metal in the head of the rail. After the machine is set correctly, the operator starts to work the flame across the rail head until it is heated to the proper temperature, as determined by the color of the surface, which usually requires from 30 to 35 sec. for 112-lb. rail. The machine is then moved ahead and the joint is allowed to cool naturally, that is, without quenching. Tests under service have shown that end hardening performed in this manner is effective in retarding chipping and the rate at which batter and flow of metal occur.

Joints Are Reconditioned

On the Northern lines of the Missouri Pacific, 3,400 miles of rail ends have been rebuilt by gas welding and 1,000 miles by arc welding since 1926. The arc welding was done under contract, while the gas welding was done by the railway's own forces. Our experience indicates that the merits of the two methods are equal under similar conditions, with the advantages and disadvantages about balanced. Arc welding produces a surface of greater hardness, but the cost has been somewhat higher than for gas welding.

Before the rail ends are rebuilt by welding it is desirable that the track forces tighten all bolts, apply joint-bar shims, tamp the joint ties solidly and reverse the bars on multiple-track lines, where wear has been sufficient to require that this be done. This preparatory work will not only reduce by one to two inches a joint the length of the welds that otherwise would be applied, but is essential if one desires to obtain smooth-riding track.

Tempered Shims

Where the fishing surfaces have become worn, the application of tempered shims between the joint bars and the rail is a satisfactory method of tightening up the joint. It is of great importance that the shims shall not be too thick, for where the joints are "over shimmed" there is danger that the bars will be broken or that the alinement of the joint will be distorted. The application of joint shims demands accurate work and this requires some experience for satisfactory results.

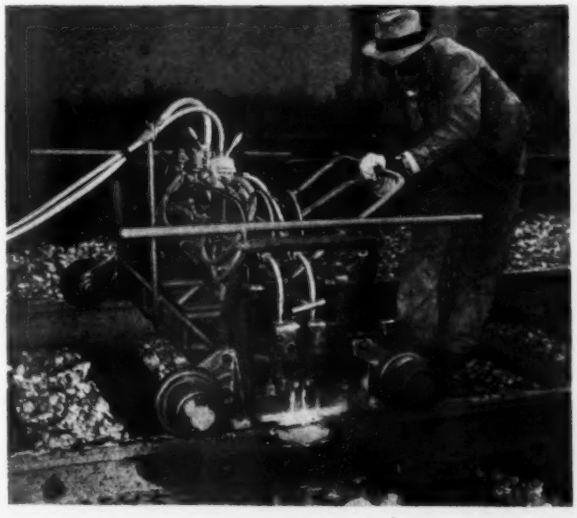
It is seldom necessary to apply shims to more than 25 per cent of the joints, since tightening bolts, replacing broken spring washers and tamping will be all that is necessary on the remainder. The use of power-operated bolt tighteners ahead of welding gangs has been found to be economical and entirely satisfactory. Where possible, the rebuilding of rail ends should be co-ordinated with the surfacing of newly laid released rail and out-of-face surfacing programs to avoid unnecessary preparatory work.

Building Up Worn Bars

Some roads have adopted the practice of building up worn joint bars by welding in preference to using shims. This is done in the field where wear can be gaged easily and where the reconditioned bars can be fitted to the rail. In this operation, the old bars are taken off, being replaced temporarily by other bars provided for this purpose. The worn places on the fishing surfaces are then built up by welding, these surfaces are then ground to dimension and for the purpose of smoothing the welded surface, and are reapplied. Information indicates that this method of reconditioning bars has been successful, and that the cost is about $0.50 a joint.

The use of shims should be avoided where the rail ends are badly battered, and at joints requiring long welds, where they will be subjected to excessive heating. When tempered shims are heated, as is likely to occur on long welds, they break, thin out and the temper is lost, so that they become ineffective. Tempered shims can be used without danger of damage where welds less than 8 in. long are required. If the welds are longer it is preferable to build up the joint bars by welding.

Reformed bars are generally satisfactory for use on released rail that is laid on secondary lines. Where reformed bars are used ahead of welding, the use of shims or the rebuilding of the bars released with the rail will not be necessary. The principal objection to reformed bars is that they are prone to develop cracks soon after they are applied. These cracks probably existed before the bars were

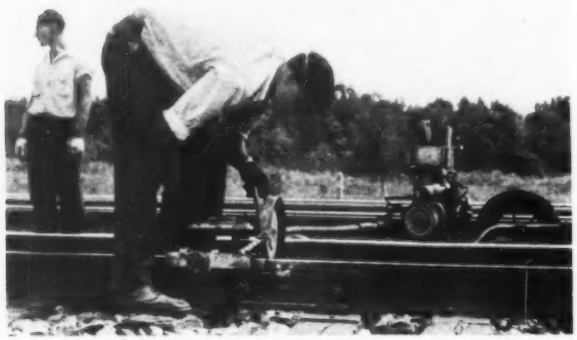


End Hardening of the Rail Retards Chipping and the Rate at Which Batter and Flow of Metal Occur

put through the reforming process, but at that time were too small to be detected readily.

Welding Rail Ends

The welding gang should build up the rail ends as soon as practicable after the bolts have been tightened and the joints have been surfaced.



Cross Grinders and Surface Grinders Follow the Welders as Closely as Practicable to Complete the Reconditioning of the Joints

During the last 15 years, the Missouri Pacific has employed welding gangs varying in size from 2 to 23 men, depending on the amount and kind of work to be done. These gangs are using both the flatter and the power-driven grinder for finishing the rail surface. During 1939, a gang of 23 men was used for gas welding. It was so organized that every man had a specific task to perform, and the whole operation was based on the ability of seven welders to apply metal to the rail ends. After welding, the rail surfaces were finished with two power surface grinders and one cross grinder. The welders were relieved from performing most of the tasks incidental to their work so that they could apply themselves wholly to welding. Gas tanks, hose and regulators were handled by laborers. The gang organization is shown.

Organization of Welding Gang

1	Foreman
7	Welders
2	Operators for surface grinders
1	Helper coupling hose and regulators
1	Laborer moving hose and regulators
1	Laborer uncoupling and rolling up hose behind welders
2	Laborers assisting with surface grinders
1	Helper operating cross grinder
1	Helper operating motor car and handling gas tanks
3	Laborers handling gas tanks
2	Laborers flagging
1	Night watchman
23	Total

This gang was provided with a complete outfit of cars and the necessary motor, push and trailer cars were assigned to the work. The foreman used a light motor car to send out and recall flagmen, to save time. The track was cleared and the flagmen were recalled in time to avoid stopping passenger and through freight trains. Welders were able to work on tangents without flag protection, the foreman and other members of the gang keeping a lookout for trains. This gang was able to average more than a mile of completed work a day.

In 1939 the cost of gas welding per pound of metal applied was 20 per cent less than the average cost for the five year period ending with 1938. This reduction was brought about by changing the gang organization, the use of power equipment, better supervision and special attention to saving material where this could be done without detriment to the work. It is of interest that this saving was made despite the fact that the hourly rate for labor was five cents more in 1938 and 1939 than it was during the four years ending with 1937.

In preparation for the welding, the foreman marks the limit of the weld for each joint and indicates the length and depth of the weld in inches on the tie, for the information of the welder and the grinder. Welders keep records of the number of joints completed each day, together with the number of inches welded and the amount of metal applied. Each welder builds up 10 joints from one setup. He is required to check his tank pressure and to look after his tip, cushion and hand hammer. All tools and equipment are left in the field in charge of a watchman at the end of each day. The watchman saves one gang-hour daily, that would otherwise be devoted to the unproductive task of handling material, tools and equipment.

Cross grinders and surface grinders follow the welders as closely as practicable. Two surface grinders have been found to be necessary to keep the joints finished close behind the welders. It is the practice to cross grind or chamfer the rail ends to a depth of ⅛ in. Where the length of the welds does not exceed 5 to 6 in., finishing with a flatter is satisfactory and costs less. If the welds are longer it is better to use power-operated grinders for finishing the joints.

In gas welding it is important to utilize all of the usable gas from both the oxygen and acetylene tanks, and this can be done by using two and five tank manifolds, and by moving all partly used tanks ahead until they have been emptied. Tanks are tested in the field and again when they are returned to the storeroom so that if they contain usable gas they can be set aside for shop use.

Arc Welding, Under Contract, Has Also Been Used Extensively on the Missouri Pacific to Recondition Rail Ends

The 23-man gang which has been under discussion was used for out-of-face welding. There are many cases, however, where spot welding only is required, that is, where only 40 to 80 joints a mile require reconditioning. Spot welding can ordinarily be done by a gang consisting of a helper and

two welders, using the flatter for finishing. Where small gangs of this size are employed, it is advisable to have section men assist with the tanks.

Reclaiming Other Joints

In addition to the rebuilding of the rail joints, it will be found profitable to reclaim many insulated and compromise joints by welding. Where these bars are not badly worn or where they are only cracked, welding is feasible and can be done at a substantial saving. A careful workman can finish such welds by grinding without damaging the insulation.

A report presented to the A.R.E.A. about two years ago stated that the informed opinion of 73 maintenance officers indicated that the rebuilding of rail ends resulted in a saving of 41 per cent in the amount of labor required to maintain the joints. Observation indicates that this is a conservative figure.

The rebuilding of rail joints and rail ends is one phase of track maintenance that can be well planned and for which gangs can be organized to conform with varying requirements without difficulty. Welding gangs are highly specialized, and are seldom used for other work. Unlike bridge, building, section and extra gangs engaged in track work, the programs of welding gangs are not interrupted by emergencies and unforeseen assignments.

Probably the most important item necessary to insure a good job of welding relates to personnel. One should employ only welders who are adept at this class of work and who display a capacity and ability to learn and develop into competent workmen.

Issues Report on Electric Switch Heaters*

WHEN electric heaters are installed, various series and multiple connections, or transformer taps, may be provided in order that practically any desired degree of heat may be obtained at the switch at any time to compensate for the surrounding temperature and the amount of snow or ice involved. There are also available heaters which are designed to give various degrees of heat distribution in the tube in order that the portion of the unit near the point of switch, or where most needed, will dissipate more heat than that back along the rail where a smaller amount is required.

The accompanying data on the selection of sizes of switch heaters have been taken from a bulletin published by one of the larger distributors of these heaters, and from the results of installations on which information is available. These data seem to be in line with best engineering practice.

In the selection of the proper heating capacity for snow melters, consideration must be given to the worst temperature and snow conditions which may occur. Since there is a wide variation in these conditions for different localities, only approximations can be given. Based on weather conditions of the Chicago area, the following capacities of heaters have been applied.

The ratings and distributions given are subject to variation to balance phase loads, and may be reduced by reducing the voltage by means of transformer taps. In the heaters cited, that section of the heating unit near the switch point is constructed with a heat dissipation of 350 watts per foot of length in order to insure complete melting of snow and ice where the switch rail and the stock rail meet and where the space between them is close. Further back toward the heel of the switch, where there is less movement of the switch rail and more clearance, the wattage is reduced to conserve power. The heater is located with about 2½ ft. of effective heater length outside of the switch, and as the length of switch rail is increased, the length of the high wattage section is also increased. One heater is required for each switch rail (two per switch).

For movable-point frogs and short switch points, 350 watts dissipation per foot for the full length of the heater is allowed. Since the construction of movable-point frogs makes it necessary to double a heater back on itself to bring out the cables, and because of the tendency for snow to clog in the confined spaces, considerable heat is concentrated in these points. The length of heater used for movable-point frogs is likewise dependent upon the free space available along the stock rail behind the tongue, from the point of the frog. Where electric power is from a three-phase source, it is sometimes found desirable to alter the amount of heat per unit in order to obtain a balance of the load on each phase.

Electric Switch Heater Installation Data

Type of switch	Type heater	Total heat/tube (watts)	Effective heater length	Heat distribution watts per ft. of heater length
11-ft. 0-in switch	Tube	3,150	9 ft. 0 in.	350 uniform
16-ft. 6-in. switch	Tube	3,387	14 ft. 6 in.	7 ft. at 350, 7½ ft. at 125
16-ft. 6-in. switch	Tube	3,875	17 ft. 6 in.	7½ ft. at 350, 10 ft. at 125
22-ft. 0-in. switch	Tube	4,300	20 ft. 0 in.	8 ft. at 350, 12 ft. at 125
30-ft. 0-in. switch	Tube	5,637	28 ft. 0 in.	9½ ft. at 350, 18½ ft. at 125
Double-slip switch	Tube	5,250	15 ft. 0 in.	350 uniform
Double-slip switch	Tube	4,000	13 ft. 1 in.	306 uniform

A Typical Electric Switch Heater Installation in a Yard

*Abstract of the report of a committee of the Electrical section, Engineering division, Association of American Railroads, of which J. M. Trissal, electrical engineer (fixed property), Illinois Central, Chicago, was chairman, presented before the annual meeting of the Electrical section, at Chicago, on October 29, 1940.

Left—The Hudson, N. Y., Passenger Station of the New York Central as it Appears Today, Following Simplifications of Its Lines and Repainting

Right—Built in 1850, the Old Station Lent Itself Readily to Effective Modernization

Renovation Program Transforms Old Brick Station

Formerly old-fashioned and ornate in appearance, the brick station on the New York Central at Hudson, N. Y., has been transformed into a highly attractive structure, both inside and out, by means of a carefully-planned renovation program involving only a modest expenditure. Also, with an eye to present-day requirements, the station interior has been rearranged along more compact and efficient lines

AS the result of a renovation program involving only a relatively small expenditure, a complete transformation has been effected in the appearance of the passenger station of the New York Central at Hudson, N. Y. The interior of the station is now strictly modern in its appointments and cheerful in aspect, while the exterior, which previously could be described as Victorian in appearance, is now characterized by the attractive simplicity of its lines. Moreover, the interior facilities of the station have been arranged into a more efficient and compact layout, thus releasing for other uses a considerable amount of space at one end of the station.

Description of Station

The city of Hudson is located about 30 miles south of Albany, N. Y., on the Central's main line between the latter point and New York City. The station at this point was built in 1850 and is of brick construction with a gable-type roof covered with slate shingles. It is rectangular in plan and is 28 ft. by 88 ft. in over-all dimensions. The waiting room is located at the south end of the structure, and in the original layout it occupied the width of the building for a distance (interior) of 50 ft. 6 in. Along the east or street side of the waiting room was the women's room, which was 9 ft. 3 in. by 17 ft. in plan. This space projected 5 ft. into the waiting room and also the same distance beyond the outside wall of the structure on the street side.

At the westerly end of the main waiting room were the men's toilet, 10 ft. by 12 ft. in plan, and the ticket office, the latter being at the location of a bay window in the facade or track side of the station. These two rooms were separated by a corridor leading from the waiting room to a smoking room 10 ft. by 19 ft. in dimensions. Adjacent to the smoking room on the track side of the station was a small room which was used for the handling of United States mail. At the extreme

northerly end of the station, the baggage room occupied a space 11 ft. wide extending across the full width of the structure.

Other Features

In the old layout the waiting room contained settees along the walls as well as at intermediate points. Other facilities in this room included two steam radiators of an outmoded type, which were placed intermediately in the room, and a newsstand located in the northeast corner adjacent to the men's room. Settees were also provided in the smoking room and in the women's rest room. In all of the public rooms in the station the walls and ceilings were of plaster, with a wood wainscot, while the floors were of composition cement construction on a wood sub-floor.

The predominating feature of the exterior of the station was a canopy roofed with corrugated metal, which extended entirely around the station and also projected some distance from it in each direction on the track side. On the latter side of the station, the canopy was supported by pipe columns, while elsewhere the supporting members consisted of metal brackets attached to the walls of the station.

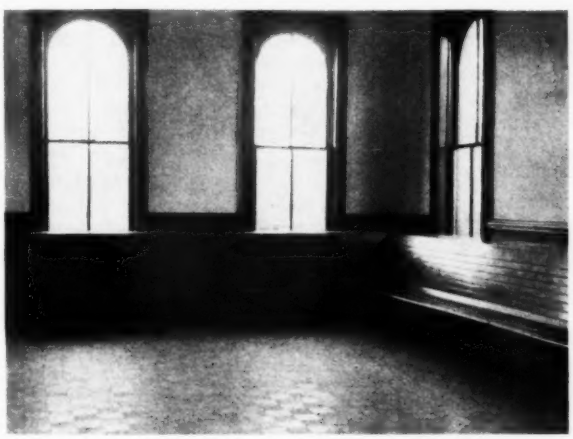
As a result of its many years of service, the station had not only attained a generally unsatisfactory condition, both inside and out, but it had also become outmoded in appearance as well as in the character of the public facilities it contained, particularly in the waiting and rest rooms. On the exterior, the canopy had become particularly objectionable. Not only did this facility comprise the principal element contributing to the old-fashioned aspect of the structure but it was otherwise unsightly in appearance and was difficult and troublesome to maintain. The canopy was also objectionable because it tended to shade the windows and hence to darken the station interior. Another feature of the station exterior that contributed to its old-fashioned appearance was an ornamental iron fence that surmounted the ridges on the roof.

Condition of Interior

As regards the interior of the station, there were a number of factors contributing to its unsatisfactory condition. In the first place the furnishings in the main waiting room, particularly the centralized radiators and the settees, were decidedly old-fashioned, while the floor was badly worn and difficult to keep clean. Similarly the fixtures in the toilet rooms were outmoded and in a generally unsatisfactory condition.

There was also the matter of size, and in this connection it is necessary to take into consideration the altered conditions that prevail today as compared with those pertaining at the time the station was constructed. For instance, whereas patrons formerly came to the station in horse-drawn vehicles, allowing themselves plenty of time and arriving considerably in advance of their train, today they come in automobiles and seldom arrive more than a few minutes in advance of train time, frequently stopping in the station only long enough to buy their tickets. Obviously one effect of this development has been to reduce the demand on waiting and rest room facilities.

In view of the foregoing considerations it was decided to subject the station to a modernizing program, not only for the purpose of improving its appearance but also with the objective in mind of bringing the size and character of its public facilities into line with present-day conditions and requirements.

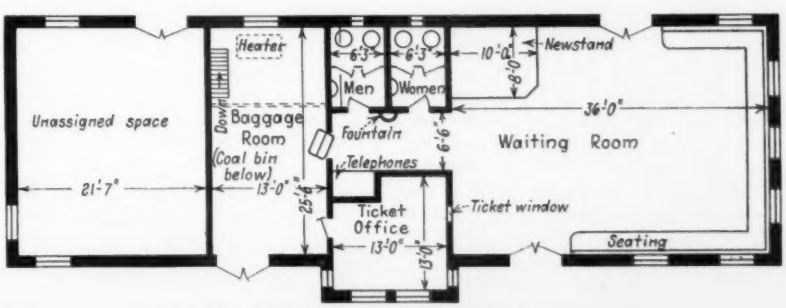


A Corner of the Main Waiting Room After Completion of the Rehabilitation Program — Radiators Are Concealed Behind the Settees

Exterior Alterations

On the exterior the canopy was removed in its entirety, this step alone being sufficient to effect a substantial improvement in the appearance of the structure. Since moisture draining from the roof of the station was formerly carried away over the canopy, it was necessary, because of the removal of the latter, to provide a cornice gutter around the edges of the roof. Other work performed on the roof of the structure included the renewal of the slate shingles where necessary, removal of the ornamental iron fence, replacement of the hips and ridges and the installation of a snow guard. As a part of the project, all old paint was removed from the exterior of the structure and it was repainted in the company's standard color scheme for stations, i. e., light green for the body and dark green for the trim.

As originally constructed, the track side of the station embodied a number of structural features that gave it an unbalanced appearance which, since it was fully revealed by the removal of the canopy, constituted an undesirable feature. Hence, as part of the renovation project, certain structural changes were made in the facade of the station to make it symmetrical about the center. As a result of these changes the facade now embodies a double door on each side of the bay window, one providing access to the waiting room and the other to the baggage room, and over each of these doors has been placed a small frame



Floor Plan of the Hudson Station As It Appears Today

marquee. These are constructed with straight lines and are exactly alike as to size and construction. Hence they impart a modernistic touch to the structure and also serve to enhance its symmetrical aspect when viewed from the track side.

Interior Changes

In planning the changes to be made in the station interior, consideration was given to the changed conditions mentioned previously, and it was decided that the size of the waiting room facilities could be reduced substantially and that the smoking room could be done away with entirely without impairing the adequacy of the service rendered. To this end the length of the waiting room was reduced from 50 ft. to 36 ft. Also, both toilet rooms, considerably reduced in size, were located alongside each other directly opposite the ticket office, being separated from the latter by a corridor 6 ft. 6 in. wide. The toilet rooms are identical in size and shape, each being 6 ft. 3 in. by 9 ft. in plan. At the opposite end of the corridor from the waiting room is the new location of the baggage room, which occupies the total width of the building for a length of 13 ft., and hence is slightly larger than the old baggage room.

Thus the effect of the reduction in the size of the waiting room and other facilities has been to condense them, including the baggage room, into the southerly 63 ft. of the station interior, thereby releasing the northerly 22 ft. for other purposes. Obviously the effect will be to reduce the expense of maintaining and heating the occupied portion of the station. Where the alteration work required the relocation of partitions, the walls were constructed of Sheetrock, except in the baggage room where they are of tongue-and-groove sheathing.

A noteworthy feature of the work done on the interior of the station is embodied in the alterations that were carried out in the main waiting room. These included the removal of all intermediate settees, and the relocation of the radiators to points along the walls behind built-in settees. Radiation is achieved through brass grilles placed in the ledge behind the seat backs and in the curtain wall underneath the seats. The new settees are placed along the south wall of the waiting room for its full length and partially along the east and west walls.

Aside from the changes mentioned above, the waiting room was entirely redecorated and refinished. The old floor was removed and replaced with a more modern covering, consisting of asphalt tile laid on a Flexboard base placed over the wood sub-floor. Embodying 6-in. by 6-in. squares, the floor tile is in two colors, dark red and terra cotta, and is laid in a checkered pattern, with a black border along the walls.

The New News Stand in the Waiting Room and the Hall Leading to the Baggage Room

Above the wainscoting, the walls are painted an ivory color, while the ceiling and the cornice molding are painted white. While the walls and ceilings of the waiting room were originally finished in a light color, their effect in imparting a cheerful aspect to the room has been considerably enhanced as a result of the removal of the canopy on the exterior. The original wood wainscoting in the waiting room, consisting of beaded tongue-and-groove chestnut with a black walnut molding at the top, was retained, the old finish being removed and a new natural finish applied. This same treatment was applied to the window and door frames, which are also of chestnut with a black walnut trim. Illumination in the waiting room is provided by the original drop lights which have frosted globes.

A feature of the waiting room is the new newsstand that was provided. The old newsstand was considered objectionable because it was not confined within a definite space, with the result that the various items on display were generally scattered over a considerable area, usually in some disorder. This situation has been remedied by installing a modern newsstand across the northeast corner of the waiting room where, by means of shelves and a counter, magazines and other items can now be displayed in an orderly and attractive fashion. All millwork in the new facility is of stained pine. Directly above the newsstand a partition extends across the corner of the room, giving it a truncated effect and imparting a modernistic aspect.

The interior finish in the toilet rooms follows closely that in the waiting room except that the asphalt tile floors are dark red throughout, while the wainscots are of stained tongue-and-groove pine with V-joints. As contrasted with the old installation, both toilet rooms embody equipment of the most modern type, each room containing a lavatory and mirror and two water closets.

In the ticket office, the decorative scheme for the walls and ceiling is also the same as in the waiting room except that the wainscot is of stained pine. Here, the operator's desk, which is arranged in the bay window, is of the built-in type with drawers and cabinets of pine and a desk top of ash. Of similar construction are the drawers and cabinets at the ticket window, with a counter also of ash.

The remodeling of the Hudson station was carried out under the supervision of K. L. Miner, supervisor of bridges and buildings at Beacon, N. Y. All the work involved was done by company forces.

$7,250,000 for Work Equipment

(Continued from page 25)

Lake Erie & Northern—Grand River
1 Welding outfit

London & Port Stanley
1 Mowing machine
1 Welding outfit

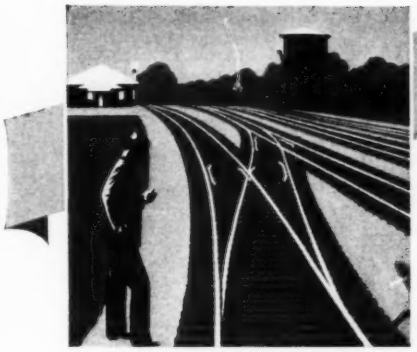
Midland Railway of Manitoba
1 Weed sprayer, chemical

Newfoundland
2 Air compressors
1 Drill, pneumatic
1 Generator
1 Motor car, inspection
1 Pump, portable
3 Welding outfits, portable

Toronto, Hamilton & Buffalo
1 Motor car, section

Mexico

Southern Pacific Railroad Co. of Mexico
6 Motor cars



WHAT'S the Answer?

Heavy Switches on Branch Lines

On a branch line laid with light rail, is there any advantage in using rail of heavier section for the turnouts? Why?

Will Improve Conditions

By H. R. CLARKE
Engineer Maintenance of Way, Chicago, Burlington & Quincy, Chicago

It is generally agreed that the turnout is the weakest place in any track that is maintained to a uniform standard. For this reason, the strengthening of the turnouts by laying rail through the turnouts of heavier section than that generally used in the line will improve conditions at this point, which is the weakest link in the chain. If the rail used on the line as a whole is of such weight that serious trouble is being experienced, and if the entire line cannot be relaid with rail of adequate section, the strengthening of the track structure by installing heavier turnouts can be justified and will be advantageous.

One of the difficulties encountered in maintaining light-weight turnouts of a rail section that is obsolete, so far as the rolling of new rail is concerned, is the securing of repair parts, such as frogs, switches and the fittings that must go with them. These troubles will be overcome by the use of turnouts of a rail section that is used more generally and is obtainable more readily.

On many branch lines, probably on most of them, there are restrictions as to the weight of motive power that will be operated. Yet, on very few lines are there any restrictions on the weights of cars that will be handled. This means that cars as heavy as those that are handled without restriction on more substantial tracks are being handled on branch lines of light construction. While the number of these cars is probably relatively small, the strain imposed on such track by even one car must be reckoned with.

Source of Accidents

By G. S. CRITES
Division Engineer, Baltimore & Ohio, Punxsutawney, Pa.

Turnouts are a prolific source of accidents, whether they are on main or branch lines. Main-line turnouts are more apt to be protected by signals and to receive more rigid inspection than those on branch lines laid with light rail. This would probably be true even if the forces assigned to the maintenance of the branch were to spend all of their time around the turnouts. However, merely laying heavier rail through turnouts on branch lines laid with light rail will not solve all of the problems connected with the maintenance of these turnouts.

The prime factor in a safe turnout lies in the support it receives. The subsoil must be drained; the ballast must be adequate to distribute the loads to the subgrade; and the ties must be sound and strong enough to hold all of the parts of the turnout in position. If these three essentials are provided, the rail in the turnout need be no heavier than that in the adjoining track, provided, however, that the turnout accessories are adequate to withstand the forces imposed upon them. The fact that the rail is light makes it desirable that the switch, the frog and the guard-rail plates be as wide and as thick as those under heavier rail and that other accessories be in keeping.

A case arose recently in which the former management of a railway left the light-rail turnouts in a branch-line track when heavier rail was laid over the entire line. There were many turnouts, and they were supported on untreated ties, without tie plates,

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered In March

1. *What merit is there in division meetings of foremen for the general discussion of their work? How often should they be held? Who else should be present? Why?*
2. *What effective and economical methods can be employed to clean brick buildings? How should the force be organized?*
3. *What effective means can be employed to prevent scouring at the discharge end of a culvert? What considerations affect this?*
4. *What practical rule can be followed for determining the bearing power of piles?*
5. *What practices in the starting and operation of motor cars are unsafe? What methods of correction should be followed?*
6. *How large a stock of pump repair parts should be carried on a division or a repairman's district? Why?*
7. *What precautions are necessary when removing shims as the frost leaves the ground in the spring?*
8. *How can galvanized roofing or siding that is beginning to show rust spots be painted?*

in inadequately drained ballast. These deficiencies were corrected in the regular maintenance program. Drainage was provided and new clean ballast of adequate section was installed. Heavy tie plates were repunched to fit the light rail and treated hardwood ties were placed under the frogs and switch points where considered necessary. Heavier switch, frog and guard-rail plates were applied as needed. In this case it was found that it was neither necessary nor economical to make an out-of-face renewal of the lightweight turnouts with heavier rail sections. The problem resolves itself, therefore, into the question as to what is a proper and economical maintenance program, with the availability of materials of proper section and standards as a factor. It might be worth while to add that a turnout cannot be inspected too rigorously or maintained to too high a standard.

Should Be Done

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

This is a thought-provoking question, for every trackman who has been in branch-line service knows of the difficulties that are encountered in the maintenance of turnouts that are laid with light rail of obsolete pattern. Most of the rail in this category originated during the period when sections were low and were cursed with thin bases. During its years of service much corrosion has occurred, particularly on the rail base, so that the rail is not fit for working up into frogs and switches; yet there is no recourse except to use a larger and heavier section for the frogs and switches, which means that the entire turnout must be renewed with the heavier rail. Again, it is difficult to obtain joint bars, rail braces, plates and other accessories to fit the light rail.

Engines and cars are so much heavier today than those which the rail was expected to carry when it was new that it seems almost ridiculous to expect the light sections, which perhaps were inadequate to carry the traffic of their day, to support them. To expect the turnout, the weakest part of the track, to do so seems still more ridiculous.

It is likely that there will be restrictions on the size of the locomotives to be operated over such a branch line, but there certainly will be no restrictions on the cars, for cars are the revenue producers, and they may cause as much or more damage as the locomotives. For these reasons, I am heartily in favor of using heavier rail through turnouts if it is not economical to renew the rail on the line.

Volute and Turbine Pumps

What is the difference between a volute and a turbine pump? For what service is each best adapted?

Volute Type Most Useful

By E. M. Grime
Engineer of Water Service, Northern Pacific, St. Paul, Minn.

The volute or true centrifugal pump is constructed with an impeller which discharges into a gradually enlarging spiral casing of snail-like shape, called a volute. The liquid enters at the center, or the eye, flows between the impeller vanes and is thrown into the volute channel by centrifugal force. The velocity energy of the liquid leaving the impeller is gradually changed into pressure head as it flows through the enlarging volute.

The turbine or diffuser type of centrifugal pump is so named because of its similarity of construction to a hydraulic turbine, except that it operates in a direction the reverse of that of the hydraulic turbine. In this pump the impeller is surrounded by gradually expanding passageways formed by stationary guide vanes. In these passageways, the direction of flow is changed and the velocity head is converted into pressure head before the liquid enters the volute.

The turbine type is primarily a small-capacity but a high-head design. Its power requirements increase as the head increases and reach a maximum at shut-off pressure. With the volute type, the lowest power requirement is at shut-off pressure. The turbine type may be selected to advantage for an installation where there will be little variation in head and where the head is unusually high. The turbine may be more efficient than the volute for capacities up to 50 gal. per min., and is comparable to the volute type up to 100 g.p.m. It is also ideal for high suction lifts, making it desirable for pumping hot or volatile liquids. It is not suitable for highly viscous liquids or those carrying sand or other debris. Its performance curve tends to show a sharp peak, compared with the volute. Because of its more complicated construction and higher cost, the turbine type is usually not justified except in large, high-pressure pumps.

The volute type answers best for the great majority of railway installations. In a proper design its efficiency curve shows a good performance over a comparatively wide range of output with, at the same time, but slight change in horsepower input. It is essentially a low-head pump, but for heads up to 150 ft. it is as efficient as the turbine type and it will not clog with debris as readily as the turbine type with its diffusion vanes. In volute pumps the power demand may vary over a wide range, depending on the variation in head, and care should be be exercised to select a motor that cannot be overloaded under any change of head conditions.

Both Have Advantages

By C. R. Knowles
Superintendent Water Service, Illinois Central, Chicago

Turbine pumps have circular casings and diffusion vanes surrounding the impeller, the function of the vanes being to reduce the velocity of the water as it leaves the impeller through gradually enlarging passages, thus transferring the velocity head to pressure head and at the same time reducing the turbulence of the water and preventing eddy currents. Volute pumps have no diffusion vanes, the casing being of spiral form which permits a uniform velocity to be maintained through the casing after the water leaves the impeller, thus serving essentially the same purpose as diffusion vanes in turbine pumps.

Under certain conditions the turbine pump has advantages over the horizontal design. It can have as many stages as the particular job requires, with a slight gain in efficiency as the number of stages increases. This pump is always submerged and requires no priming equipment. When not in use, the discharge line can be emptied by draining back through the pump, which is a great advantage when handling a liquid such as heavy fuel oil which must be kept hot. In such a case, the pump is suspended within the supply tank. The turbine pump has no stuffing boxes to require attention. It requires no extensive foundation. Because it is vertical, less floor space is required than for horizontal pumps. Because of its flex-

ibility with respect to depth of setting, the pump itself may be set beneath the low level of the liquid it is to handle, while the driving motor can be set at an elevation well above the high level of the liquid. This flexibility is of great value where the level of the supply varies between wide limits. Such a pump can often be used to avoid the necessity for the deep pit that would be required for the conventional type of horizontal pump.

A single-stage horizontal pump, handling quantities of water up to 200 or 300 gal. per min. has a practical head limit of about 200 ft. when driven at 1,800 r.p.m. If driven at twice this speed the volume of the discharge doubles, the head quadruples and the power necessary to drive the pump is multiplied by eight. This relation applies to all centrifugal pumps, and if the head is beyond the reach of a single stage unit at 1,800 r.p.m., it will be necessary to add other stages or increase the speed. Since the speed of an a-c. 60-cycle motor can be increased from 1,800 r.p.m. only to 3,600 r.p.m., there is little choice as to speed of operation. The turbine pump can meet this situation very easily and economically by merely adding more stages without change of speed.

Turbine pumps are capable of meeting many kinds of pumping problems efficiently. In addition to deep-well service, they are used as Underwriter's fire pumps, for pumping Bunker C heavy fuel oil and Diesel fuel oil, for dewatering open pits and for pumping from streams with the motor above high-water level. The advantages of the ordinary split-case pump are that it may cost slightly less for the same capacity and it may be a trifle more efficient, but this latter advantage is not always present and should be considered separately for each particular installation.

Examination on Safety Rules

Should maintenance of way employees be examined on safety rules? Why? If so, who should take the examination? At what intervals?

They Should Be

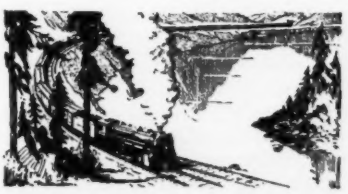
By C. F. Larson
Superintendent of Safety, Missouri Pacific, St. Louis, Mo.

The answer to this question is yes. The reason is that safety rules provide, by means of education, the best and surest method of instilling into the minds of the men the things that must be avoided in the course of their daily work. These rules also teach them how to perform their duties in a manner that will save them from painful injury and loss of time and wages. In general, safety rules are written in language that is easily understood, and every employee who can read should be provided with a copy.

Merely to place the rules in the hands of the employee is not sufficient. The fact that he has been given and has kept possession of a copy of the rules is no proof that he has studied or even read them. The only way that one can ascertain that he has read them thoroughly and has digested them is to examine him to find how much he knows about them. The examination should be conducted by the division superintendent or by his designated representative, who may be the division engineer, the bridge and building supervisor, the road-master or the track supervisor.

These examinations should be at intervals not greater than 12 months. As the work of the maintenance of way department is more or less seasonal, the examination should be held at the beginning of the working season to include all new employees, who should be introduced to the rules that will be expected to control their actions during their employment, and should act to refresh the knowledge of the rules of the older and more permanent employees.

Lack of understanding between men or groups of men where movements are to be made, or where material is to be placed or thrown, is the cause of many accidents. The necessity for wearing eye protection is one of the most valuable rules, but if the employee is ignorant of the requirement of the rules in this respect, the foundation is laid for eye injuries. To avoid such injuries is a matter of education and that education is found in those formulas designated as safety rules, and it is essential that every employee be made conscious of them. It is obvious that the employer has no way of determining the extent of his employee's knowledge of the rules, except through examination.



There is also the further need for having the employee examined when the question of discipline is involved for infractions of safety rules. A constructive definition of discipline, which falls naturally into three parts, and which is easily understood, is:

1. Education, instruction, submission to order, training to act in accordance with established rules, and functioning under the rules.
2. Self-control, subjugation to the rules and the habit of obedience.
3. Correction, chastisement and punishment.

The teaching and training are almost wholly a function of the division organization. Local officers must develop their own method of indicating to every employee that they have a working knowledge of the rules and that they are capable of noting non-observance of the rules when they occur.

Punitive discipline for violation of rules cannot be imposed upon an employee, justly or effectively, unless there is definite knowledge, gained by means of a record, that he has been examined and knew the rules that he violated through thoughtlessness or by deliberate intent. The necessity for examination on safety rules, is, therefore, imperative if proper discipline is to be administered and safe operation is to be assured.

Must Follow Education

By W. Woolsey
Section Foreman, Illinois Central, Chicago

I am heartily in favor of requiring examinations on safety rules, but it should not be overlooked that an examination will be entirely useless unless some organized effort is made to educate the men to the meaning and purpose of the rules and to the best way to apply them. Going still further, education implies a thoroughly qualified teaching force, for experience has shown that without the spur of precept and example, men will soon become indifferent and careless, even if their interest has been aroused temporarily, or they will remain inert with respect to the rules if it has not been aroused.

My observation leads me to believe that the foreman is best situated to instruct the men working for him and to keep their interest constantly aroused. Not a few foremen of whom

I know make it a practice to discuss one safety rule every morning before the men start to work; others do this during the lunch hour. This form of instruction should not stop with the reading of the rule, but its meaning should be discussed thoroughly and every man should be shown that the rule was written for a definite reason, and the foreman should assure himself that every one understands it clearly and knows how to apply it.

Obviously, all foremen will not do this to the same standard, and those who are below the proper standard in their teaching should be taken in hand by the supervisor or roadmaster. A by-product of such a system is that those who attempt to teach their subordinates will have a clearer knowledge of the rules and their application than they would have obtained otherwise and they will be more alert to notice violations and to correct them.

I believe that the best results will be obtained if examinations are held every three months. This can be done by classes and oral examination, which will give an opportunity for discussion of obscure points that may be raised. I am aware that it will be difficult to hold examinations regularly four times a year, but the intervals should be as near this as practicable.

Guard Timbers or Guard Rails?

What are the relative advantages and disadvantages of inside guard rails and outside guard timbers on open-deck bridges? How should they be placed?

Tie Spacers Only

By A. R. Ketterson
Engineer of Bridges, Canadian Pacific, Montreal, Que.

It is inferred from the terminology that the question does not refer to the timber tie spacer, which is sometimes called an outside guard timber, but to the longitudinal timber runner which at one time was commonly placed a short distance outside of the track rails. These timber scantlings usually had their track side and top surface protected by an angle iron, and they were intended to function as guard rails. It was also intended that their position with respect to the running rail should be such that the bodies of derailed equipment would not side-swipe members of a through span and would be prevented from getting so far over as to fall off a deck span.

As a device for controlling the path of derailed wheels on an open-deck bridge under modern traffic loads and speeds, there is little merit in this type of guard rail. Experience has shown that, to be really effective when called upon to function, all guard rails that are intended to control the path of derailed wheels should be located between the running rails and should be constructed of second-hand rails. Sound rails that are not suitable for relaying in main tracks should be satisfactory.

It is difficult to conceive how outer guard timbers can have any advantages over inside metal guard rails, for they labor under the disadvantage that timbers, even when armored, are not suitable for this purpose. Two inner metal guard rails, one alongside each running rail and having its center line about 13½ in. from the gage line, should possess no disadvantages. To be effective, inner guard rails should be spiked securely to every tie and all joints should be spliced. The best practice requires that these rails should not be higher than the running rails, and not more than one inch lower. The distance they should be carried beyond the abutments depends upon track curvature and other local conditions, but I believe that it should not be less than 25 ft.

It is the practice on some roads to curve the ends of inner guard rails inward to meet at the center of the track and to bend the ends down into the ballast between two ties to prevent dragging gear from striking a square-faced end. Recommended practice requires that outer guard timbers should be intended to function only as tie spacers and that they should, therefore, be located along the ends of the bridge ties and be fastened to every bridge tie.

There Is No Comparison

By Engineer of Bridges

Inner guard rails, which usually consist of second-hand or scrap rails of the same or next lighter section than the track rails, function to hold derailed wheels in line and thus prevent derailed equipment from damaging trusses or girders and filling stream beds. The function of outside guard timbers is, or should be, principally to maintain uniform spacing of the ties on open-deck bridges. So far as I can see, therefore, there can be no relative advantages between inside guard rails and outer guard timbers for the simple reason that, because their functions are so different, there is no basis for comparison.

Occasionally, a guard timber is placed inside of the running rails, with or without an angle iron or strap to armor it, to serve as a tie spacer and to restrict the lateral movement of wheels that may become derailed. I do not believe this to be a good plan, since the angle irons and straps tend to become loose on the timbers and will have relatively little holding power in case of a derailment, compared with an inner guard rail constructed of T-rails.

It is particularly desirable to install inner guard rails on structures of unusual height or length, or where the structure is on a curve. The economic need for guard rails must be determined by local conditions. The installation of guard timbers, or of some suitable substitute to hold the ties to the proper spacing is practically a necessity, whereas the need for an inner guard rail is governed by the location and design of the structure.

Inside Guards Best

By L. G. Byrd
Supervisor of Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

Obviously, the purpose of a guard rail or a guard timber is to protect both equipment and structure from damage in the event of a derailment on the bridge itself or on the approach thereto. Long experience has shown that inside metal guard rails, preferably second-hand track rails, secured thoroughly by means of spikes, plates and rail braces, will hold the wheels in line and will prevent serious damage to both the bridge and the equipment.

Requirements for inside guard rails should be determined from the length and height of the bridge, its location, the class of track and the volume and speed of traffic. Where a derailment occurs on a curve approaching a bridge, there is danger of serious damage if the bridge is not protected with inside guard rails, but where such guard rails are installed, the damage rarely amounts to more than a few ties badly scarred or broken by the derailed equipment.

It is our practice to install inside guard rails on all open and ballast-deck bridges where the length of the structure is greater than 100 ft., and its height is more than 10 ft., but we

also install them on shorter bridges on curves. They are placed 8 in. from the gage side of the running rails on each side of the track and extend the full length of the bridge and out onto the approach 60 ft. at each end. They are curved inward at the ends and are attached to frog points at the center of the track. Rail braces are installed at every tie on the inside of curves. The only disadvantage of the inside guard rail is that it requires more labor to make a partial or complete renewal of the ties on the bridge because of the extra fastenings.

Outside guard timbers function primarily for holding the ties in the deck to the correct spacing, and thus to prevent the bunching or slueing which so often occurs under traffic when the ties are not held definitely in position, as well as to prevent similar action in the event of a derailment. They are applied at a point about four feet from the center of the track, measured to the center of the guard timber, and are anchored to each tie by means of ¾-in. lag screws, which penetrate approximately five inches into the tie.

We have found the use of light rails in place of the outside guard timbers to be effective. We drill through the flanges of the base for ¾-in. lag screws or bolts which pass through every tie. The joints are butt joints but no joint bars are used. At the ends of the bridge they are bent down over the backwall at an angle of about 45 deg. We believe that these metal rails reduce the fire hazard and that they also reduce renewals, especially where untreated material is in use. Where the spacing of the drilling corresponds to our standard tie spacing, those outside guards can be transferred from one bridge to another in case this is desired.

Trucks for Fighting Snow

To what extent is it feasible to use motor trucks for handling snow? In what ways?

Finds Many Uses

By George M. O'Rourke
District Engineer, Illinois Central, Chicago

It was about 15 years ago that motor trucks began to be used generally for handling snow in congested terminals, where they proved to be effective for moving men quickly from place to place; for delivering sand, salt, sawdust, and tools at the points where they were needed; and for hauling snow to points of disposal. The first two items generally are emergency requirements and over a course of years the trucks have proved to be very useful in keeping the men on the job supplied.

After the storm has subsided, however, a considerable amount of clean-up work is essential if the work of keeping the tracks open during later storms is not to be impeded by accumulations of snow that have not been removed promptly. The disposal of snow after the storm has ceased thus becomes a matter of urgent necessity. It greatly increases the cost of fighting snow and has often taxed the ingenuity of maintenance officers to devise means for accomplishing this disposal within a reasonable time. The prompt removal of snow and ice from the tracks serves a two-fold purpose—it allows traffic to move freely and clears the way for later snow fall which might otherwise quickly delay or even interrupt traffic. It is necessary at station platforms and driveways to insure safety and comfort for the traveling public and at teamways to allow freight receipts and deliveries to be handled expeditiously.

In the past, a great amount of money has been spent "chasing snowflakes," that is, in handling snow several times before final disposal. Today, as soon as the snow stops falling we commence to load it into trucks for haulage to dumping grounds or, on the Chicago terminal, to Lake Michigan. The loading is done with crawler-mounted tractors equipped with front-end loaders and with cranes equipped with clamshell buckets. When we are unable to cope with the situation with the motor trucks and trailers we ourselves own, we secure the services of local trucking concerns, usually on an hourly basis.

Not the least of the advantages with which the motor truck can be credited is that of marked economy, compared with the methods previously in vogue. After the property has been cleared of snow, the work of replenishing exhausted or partially exhausted supplies of sand, salt and sawdust, is undertaken immediately, and all preparations are completed for meeting the requirements of the next snow storm. The most economical way to do this on a large terminal is with motor trucks, thus serving two purposes economically and satisfactorily.

A Great Improvement

By Roadmaster

Almost anything that will increase output without interfering with other essential tasks during the progress of a snow storm is beneficial, and the motor truck has proved that it can be used to speed up operations under the stress of keeping switches and tracks open during snow storms. Likewise, at this time, many of the needs of the forces engaged in this work are emergency in character, such as the delivery of tools and supplies, particularly at remote points that cannot be reached easily by ordinary methods. The motor truck is flexible and, if the forces are well organized, easily available for delivery service. In fact, modern snow-fighting forces in congested terminals can scarcely get along without them.

Before the motor truck began to be used in this manner as an aid to the forces fighting snow, it was necessary in many instances to establish supply depots at widely scattered points where they were subject to only nominal supervision. During a bad storm it was difficult to make deliveries from these small supply headquarters to any but the closest gangs. Furthermore, under the conditions that prevailed during a storm, it was difficult, or generally impossible, to keep an accurate account of the disposition of the supplies.

This is not intended to imply that we were dependent on these small and scattered supply depots for the normal equipment of our gangs; they were intended for emergency use only, but we seldom got through a bad storm without having to draw on some or all of them for tools and supplies, to replace the wastage that occurs in every storm or replenish supplies used in unexpected quantities.

Today, the arrangement is much more convenient. We equip and supply our regular gangs in advance of winter storms in substantially the same manner as before, and we follow much the same practice for providing the tools needed by the extra forces, but we have done away with the small emergency-supply stations and handle all emergency calls from a central point. We find that the supplies are now delivered to the point of use as soon, or even sooner in most cases, after the need for them has arisen, as was possible previously. They are received in the quantities sent, instead of with the shortage that used to be

common, and it is possible to keep an accurate record of the disbursements.

After the storm is over, and sometimes during its progress, it becomes necessary to remove accumulations of snow from many points in preparation for the next storm or to insure room for the continued disposition of the snow that is falling. Here is where the motor truck has been of almost inestimable value, for we were often hard put to dispose of these accumulations, particularly at team tracks and from the driveways around freight houses. It was often necessary to load a considerable volume of snow into cars, but this was expensive for it had to be unloaded before the cars could be used, and they were generally kept out of revenue service for several days at a time when they were most in demand.

Today, we use motor trucks, our own so far as possible, calling upon a teaming concern with which we have arrangements for such additional trucks as we need. Now this feature of the storm, which used to be greatly dreaded, is finished in a short time, with no great disturbance to routine work, since we use tractors with front-end loaders and cranes with clamshells to do the loading. Incidentally, it should be pointed out that this loading equipment is as important as the trucks for this operation.

Paving Turntable Pits

What are the relative advantages and disadvantages of concrete and vitrified brick for paving turntable pits?

Both Are Well Suited

By Frank R. Judd
Engineer of Buildings, Illinois Central, Chicago

Both of these materials are well suited for paving turntable pits and should give about the same results. There is not much to choose between them, but it is believed that brick has a slight advantage over concrete, in that it does not require protection if the pavement must be laid during cold weather. Again, in the event of alterations that require the removal of the pavement, the brick can be salvaged and reused, while the removal of the brick is less expensive than the removal of a concrete paving slab.

Prefers Concrete

By L. G. Byrd
Supervisor of Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

Experience with turntable pits paved with both concrete and brick leads to a preference for the concrete, for we find that it gives greater satisfaction, costs less to construct, requires less maintenance and can be kept clean with less labor. The concrete is laid in V-form, that is, as sectors, measuring from 18 to 24 ft. along the circle rail, and the construction joints are filled with an asphalt compound. This eliminates the growth of vegetation that is so troublesome in the brick paving and prevents the heaving of the pit floor from frost action or, in some cases from pressure of water in the soil.

No turntable pit should ever be constructed without adequate provision for drainage. This should include both subsoil drainage and surface drainage, for if the former is inadequate the pit floor and perhaps the foundations will be unstable, while insufficient surface drainage may interfere with the operation of the turntable, besides making it difficult to keep either the turntable itself or the pit clean. A wet subsoil in northern climates almost invariably leads to heaving and sometimes to disintegration of the paving. To avoid the necessity for cutting into the paving after it is once laid, all water lines, air lines and electrical wiring should be placed in suitable conduits so that they can be renewed or repaired without disturbing the paving.

A disadvantage of bricks for paving turntable pits is that it requires more labor and attention to keep the pit clean of the debris that tends to collect in all turntable pits. Brick also gives trouble, particularly in the warmer sections of the country where the growing season is long, because it is almost impossible to keep vegetation from growing in the seams between the bricks. Because it is difficult and usually quite impossible to seal the joints between the bricks, any water that there may be in the subsoil will find its way through the joints and will keep the surface of the paving wet for long periods. This does not occur with concrete, particularly if the joints are kept filled with a sealing compound. It is our experience that greases, oils and other wastes are much more easily removed from concrete surfaces than from the less smooth surface of the brick.

Concrete Is Cheaper

By G. A. Haggander
Assistant Chief Engineer, Chicago, Burlington & Quincy, Chicago

Our investigations show that concrete pavement is somewhat cheaper than brick pavement of the same depth, for turntable pits. For this reason, we generally use concrete pavement on a cinder base to insure subdrainage. Concrete is somewhat stronger than brick pavement, and presents a smoother surface for cleaning and drainage.

When to Clean Stone Ballast

How can one determine how frequently stone ballast should be cleaned? What benefits ensue?

Livens Track

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

In the first place, the section foreman and the supervisor should have a sufficiently intimate and detailed knowledge of track conditions, including the ballast, to know when cleaning is needed, without the formality of an inspection. On the other hand, if a general cleaning of the ballast is in prospect, it may be desirable to make a thorough investigation of certain stretches where the ballast, while not new, has not yet reached the stage where cleaning can be justified except, possibly, as a part of a general program.

When ballast becomes fouled to the extent that drainage is blocked, the evidence of need for cleaning is clear and unmistakable. Blocked drainage means churning ties, poor surface, center-bound track, unsatisfactory line, difficult maintenance and other ills that can be cured only by clean ballast of sufficient section to distribute the traffic loads to a well-drained, stable roadbed.

Clean ballast provides quick drainage that results in dry track. It makes it possible to hold track to line and surface, and to correct the center-bound condition that invariably accompanies foul ballast. Track surfaced on clean ballast is resilient and can be kept in good-riding condition. It will be free of vegetation, the curse of foul ballast. It also tends to conserve ties, by keeping them dry and reducing the amount of tamping.

Cannot Specify Intervals

By District Engineer

It is impossible to state any specific intervals at which stone ballast should be cleaned, or to deduce any formula by which such intervals can be determined. The conditions under which ballast is applied and used vary between such wide limits that every case is an individual one that must be considered in the light of local conditions. These intervals are influenced by the volume, character and speed of traffic; by grade conditions; by drainage and the soil of the locality, as well as by the climate, that is, by the amount of precipitation, extremes of temperature and the prevailing winds.

I have known ballast that needed cleaning oftener than once a year and that actually was cleaned annually, and I have also known ballast that could go as much as 10 to 12 years with only slight detriment to the track. In the first instance, the ballast was on a heavy ascending grade on an unusually heavy-traffic line, in a section where the annual rainfall was high; the second one was in semi-arid country where grades were light and traffic density was much lower.

Ballast requires cleaning when it becomes so foul that drainage is blocked. This may occur by reason of stack screenings on heavy grades, which was the cause in the case cited, because soil is blown in, as a result of dirt and debris dropped from cars, through defective surface or roadbed drainage or from other causes. Whatever the cause, track conditions become progressively worse and leave no doubt as to the need for cleaning. Where rainfall occurs in any quantity, the ties will churn, it becomes impossible to maintain line and surface without excessive maintenance cost, the track tends to become center bound, and joints cannot be kept up.

As to the benefits—all of these ills will be avoided by maintaining clean ballast. Maintenance costs will be lower, the track will stay in line and surface and center-bound track is less likely to occur, while joints will be maintained more easily. In short, the riding condition of the track will be improved, and at the same time maintenance costs will be less.

When Wrecking Buildings

When wrecking buildings, what methods should be followed to insure maximum salvage?

Make Careful Survey

By Frank H. Soothill
Chief Estimator, Building Department, Illinois Central, Chicago

Experience has shown that when a building is to be demolished, the most economical plan is to pursue the wrecking operations in the quickest possible way, disregarding the value of any items of material that can be salvaged, except radiators, plumbing fixtures, doors, sash, etc., which can be removed easily. Generally speaking, the principal items of salvage recoverable from wrecking operations are lumber, iron and brick.

In general, buildings are demolished because (1) they are no longer in safe condition; (2) they are no longer needed for railway purposes and cannot be leased profitably; (3) taxes must be paid on them as long as they remain in existence; (4) they must be maintained as long as they are retained; and (5) it is desired to replace them with new structures.

Probably the first thing to be considered before deciding to wreck a building with company labor is whether the cost of recovering serviceable material will exceed the value of similar material in the new or second-hand market. It happens frequently that the expense of recovering second-hand lumber from old structures equals or exceeds the current market price for new lumber. For this reason, a careful survey of the structure should first be made and an estimate prepared to cover (1) the cost of removal by company forces and (2) the value of the material that can be recovered. At the time this survey is under way, bids should be secured from companies or individuals who may be interested in buying it. In many instances, it will be found that buildings can be wrecked by outside parties who will be willing to pay a price that will show a profit, compared with the net cost of removal by company forces.

Close Supervision Needed

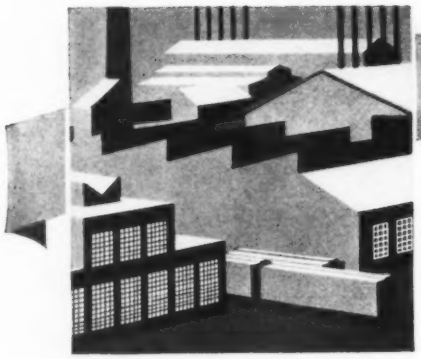
By L. G. Byrd
Supervisor Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

When a building is to be wrecked, the supervisor should outline a plan for doing the work both safely and economically, which will insure against damage to the material as it is removed from the structure. He should issue clear-cut instructions to the forces that are to do the work. Then close supervision should be exercised to see that these instructions are followed.

Under all conditions all interior material, such as plumbing, heating equipment and lighting fixtures should be removed first. This should be followed by doors and windows. The next step is to remove the plastering from ceilings. The roof can now be removed. If it is prepared roofing, built-up roofing or wood shingles, there will be no salvage, but if asbestos shingles, tile or slate have been applied, they should be removed, starting at the ridge, and tied in bundles or placed in small hand boxes to be lowered to the ground by ropes or passed down by hand. The sheathing can then be taken off, again starting at the top.

Materials of the several classes and lengths should be segregated, since this will permit easy selection for use in other structures. Too often, the wrecking of buildings has been attended by almost complete loss of easily recoverable material, largely through failure to create the proper interest in the work to be performed. Two important tools are adapted particularly for removing siding, ceiling and flooring. These are a 22-in. hacksaw blade, made of special toughened and hardened steel, with an adjustable handle for cutting at any pitch, to saw nails, bolts, etc. It is worked between the flooring, ceiling or siding and the joists. The other is a long flat-bladed cutting chisel 12 to 18 in. long. This is also used to cut nails close to joists and eliminates such splitting of the material as occurs through the use of claw hammers or wrecking bars.

Where buildings are more than one story high, it will be an advantage to use gin poles to lower the salvaged material. A small hoisting derrick will be advantageous for lowering buildings in sections where the height is greater than two stories.



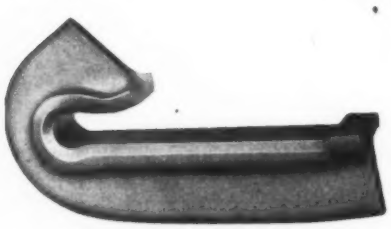
PRODUCTS of Manufacturers

Amsco Mo-Mang Steel Welding Rod

THE American Manganese Steel Division of the American Brake Shoe & Foundry Company, Chicago Heights, Ill., has placed the Amsco Mo-Mang, a new welding rod, on the market. The Amsco Mo-Mang is a manganese-molybdenum steel welding rod, which is available in 18 in. lengths, in the bare form for straight d.c. welding or with combination coating for both a.c. and d.c. applications. It is adapted to building up worn high manganese, carbon steel and grey iron castings, in applications that demand high tensile strength or extreme shock resistance or both.

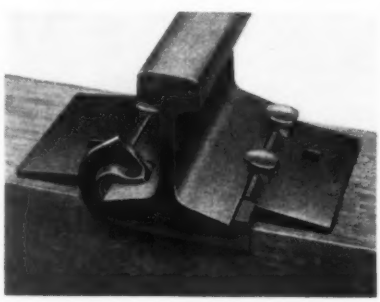
Improved Fair Rail Anchor

The Improved Fair rail anchor is now being placed on the market by the P & M Company, Chicago, with new features which are designed to add greatly to its efficiency. The new anti-creeper is made from high carbon, heat-treated steel rolled to a special tee section which is said to permit greater refinement of heat treating and give greater strength. The tee section provides a cross member flanged on both sides, which enables the anti-creeper to accommodate itself to various bearing requirements. It will bear against the tie plate only, where the tie plate covers the entire face of the tie: It will contact the tie only, where the edge of the tie plate sets back from the face of the tie more than a given distance; or it will contact both the tie and the tie plate, where the edge of the tie plate sets back from the face of the tie a normal distance.



The Improved Fair Anchor

Because it will accommodate itself to these various bearing requirements and because it has a greater bearing area than any anti-creeper previously manufactured by this company, it is said that the creeping load is evenly distributed, and undue wear of the tie is eliminated. Several million of the Improved Fair anchors have already been placed in service, and it is reported that the service records to date are very satisfactory.



Improved Fair Anchor in Place, Showing Bearing Against Both the Tie Plate and Tie

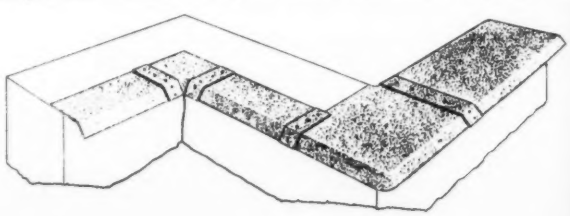
Improved Colorflex

THE Flexrock Company, Philadelphia, Pa., has improved Colorflex, a pigmented compound used as a floor-finishing treatment for concrete or wood floors to make it fire-, acid- and largely alkali-resistant. Colorflex is available in four colors, linoleum brown, tile red, emerald green and battleship gray. Tests of the improved product are said to show that it resists damage from fire and sulphuric and carbolic acid, and tests with a strong alkali (sodium hydroxide), are said to show that this substance does not mar the finish, except in the case of the green color, in which case a yellowish discoloration results.

Teco Termite Shields

THE Timber Engineering Company, Washington, D. C., has developed a complete line of pan- and strip-type termite shields for installation at the top of foundation walls and piers or to be inserted in the walls to provide a constant protection against termite attack. The Teco shields are die-pressed from 26-gage corrosion-resistant steel and zinc-coated by the hot-dipped process. A patented shield connector, which can be applied without tools, makes tight joints between lengths of shields and permits the expansion and contraction of the metal. The shields are available in standard sizes and shapes suitable for almost any type of installation and corner layouts. Special joints and details are easily made.

In their installation it is recommended that the shields be set on walls simultaneously with the sill in a cement mortar bed at least ⅛-in. thick for frame construction, or shall be properly wedged and pointed into a slot, joint or recess in the masonry wall. They should project horizontally at least two inches beyond the



Showing Method of Applying Pan and Strip-Type Teco Shields on a Foundation Wall

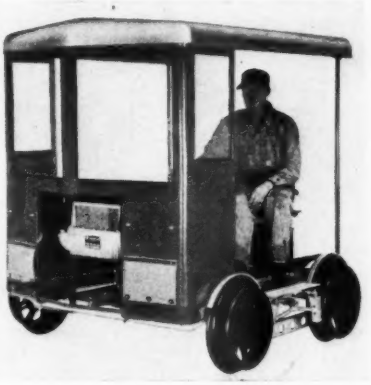
face of the wall, and then an additional two inches turned downward at an angle of 45 deg. The pan-type shields, which extend across the entire width of masonry walls or piers, are suitable for walls eight inches in width or less and should be used when each face of the wall is not exposed to easy and frequent inspection. The strip-type shields can be used on walls of any width and should be used on the unexposed face of a wall, when the other face is open to frequent inspection.

It is said that Teco termite shields provide constant protection against termite infestation and meet the requirements of the most exacting specifications and building codes, including the requirements of the Bureau of Entomology of the United State Department of Agriculture.

New Cab Top for Inspection Motor Cars

A new cab top, which weighs only 125 lb. completely assembled, has been developed for installation on one- to four-man inspection cars by Fairmont Railway Motors, Inc., Fairmont, Minn. The cab top is designed to protect riders from sleet, snow and icy winds in the winter and from rain and the sun's rays in the summer.

The frame of the cab is composed of six welded sections bolted together. Sheet steel is used for the walls and canvas-covered plywood for the top. The top is specially treated and painted to insure a waterproof covering. Two large windows of shatter-proof glass in front and two smaller side windows give clear vision. The windows are mounted in rubber to make them water tight and to cushion them against shocks and jolts.



Inspection Car Equipped With the Cab Top

What Our Readers Think

More on Tie Renewal Practices

Ada, Okla.

To the Editor:

I have read with much interest the article in the November issue of *Railway Engineering and Maintenance*, by H. R. Clarke, engineer maintenance of way of the Burlington, on Renewing 50,000,000 Ties a Year. There has been a large amount of waste in tie renewals, both in ties and in labor. This waste has been reduced greatly in recent years by improved inspection and improved methods of making renewals, but there still is opportunity for further economies.

I believe that ties to be renewed should be determined by the section foremen in the fall and then checked by the supervisor, the supervisor covering about two miles on each section. From the results of these two inspections, it should be possible to work up the tie program for the ensuing year in line with actual requirements. The new ties should be delivered early in the spring so that renewals can be completed by July 1, with only a small carryover. If a large number of ties are on the ground in the fall, they may be damaged by right-of-way fires.

I do not believe it is good practice to take ties out of main tracks that will last two or three years, load them on work trains, and insert them in "back" tracks. I am particularly opposed to making 100 per cent tie renewals in back tracks with such ties. If such ties are to be used in these tracks, a new tie should be used for about every fourth tie, because otherwise the ties in such tracks will all become unserviceable and call for renewal at the same time.

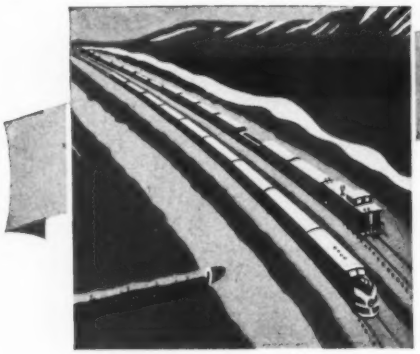
Furthermore, I do not believe that it is good practice to spot in ties where 100 or less per mile must be renewed. I prefer to carry this kind of track another year without renewals and use the ties available where I have a worse tie condition. Besides, I am not in favor of spotting in ties when this can be avoided. This method, which requires that the old tie bed be cut down, always produces a choppy, bad-riding condition, and the more ties that are spotted in, the worse the track rides because it is impossible to secure as firm a bearing for the new ties as existed beneath the old ties. I believe that where 300 or 400 ties must be renewed per mile of track, the track should be surfaced out-of-face, i.e., given a lift of about two inches, or just enough to get the old ties out and the new ties in. One will then have an even bearing for all ties and a better riding track.

I do not favor the use of special tie gangs for spotting in ties. Such gangs always include some inexperienced men who do not do a good job. Furthermore, these gangs are always hurrying in an effort to make a record, which is reflected in the character of their work. As a result, the section foreman is frequently criticized about the riding condition of his track for a year or two after the special tie gang works over it. If ties are to be spotted in, I prefer to use regular section gangs, giving them extra men if necessary. Under this arrangement, a more satisfactory job and better riding track will result, because the foreman will be more interested in producing good track conditions than in making a record relative to the number of ties inserted.

As records are kept, it is almost impossible for section gangs to show the same efficiency in tie renewals as special tie gangs, because where these latter gangs are employed, section gangs usually have to work with them, distributing ties and tie plates, piling and burning old ties, and picking up scrap, and the time required for these auxiliary operations is never charged to the cost of inserting ties by the special tie gangs. On any road with as much as 1,000 miles of track, I believe it would pay to have a special man with jurisdiction over all tie renewals.

As to mechanical tools to aid in the work of tie renewals, I doubt that we will ever be able to get equipment that will show an actual saving as compared with present hand labor methods. The total cost of inserting a new tie, it must be remembered, is based upon the total time involved in its renewal, from the time the new tie is unloaded until it is in the track, and the old tie replaced has been piled and burned. However, if manufacturers will produce a mechanical tool that will lower the cost of making tie renewals, I am sure that it will be used extensively by the railways.

L. D. Gardner,
Roadmaster,
St. Louis-San Francisco.



NEWS of the Month

Payments Insufficient For Railroad Pension System

According to a report submitted to Congress by the Railroad Retirement Board's Actuarial Advisory Committee, rates under the Carriers Taxing Act will have to be increased from the present six per cent of the payroll to approximately 11.11 per cent, if they are to maintain a fund adequate to support the retirement system set up in the Railroad Retirement Act. Meanwhile, however, the Retirement Board recommends that no increase be made in the tax, which is payable half by the employees and half by the carriers, at the present time. In support of that recommendation it suggests that "there appear to be sound reasons for hesitating to accept at this time the initial experience as permanently valid."

North Western Increases Speeds

The Chicago & North Western has raised its speed limits on trains operating through automatic train control between Elmhurst, Ill., and Council Bluffs, Iowa. Under the revised control system, the maximum speed of freight trains is increased from 50 to 63 m.p.h. and the top speed of steam-powered passenger trains from 73 m.p.h. to 83 m.p.h. The maximum speed for Diesel-powered streamliners remains at 93 m.p.h. Approximately 470 miles of double track line are affected.

Grade Crossing Elimination in 1940

During the last fiscal year, 414 railroad-highway grade crossings were eliminated, 1,201 crossings were protected and 87 obsolete grade separation structures were reconstructed, according to a report of Public Roads Commissioner Thomas H. MacDonald to Federal Works Administrator John M. Carmody. Regular federal-aid authorizations for grade crossing work in 1940 were $20,000,000. Work approved or under construction at the close of the year included 412 grade crossing eliminations, 96 reconstruction projects, and 741 crossing protection projects.

Broken Rail Derails Streamliner

On December 21, twelve of fourteen passenger cars of the eastbound City of Los Angeles of the Union Pacific were derailed about four miles west of Julesburg, Colo., when a rail broke under one of the power units while the train was traveling at a speed of approximately 60 m.p.h. The broken rail was a 131-lb. controlled cooled rail laid about a year ago. Of the 200 persons on the train, seven passengers and two dining car employees were slightly injured. Damage to the roadbed and equipment was slight. The line was cleared and restored to service within ten hours after the accident. Concerning the damage to the equipment, W. M. Jeffers, president of the Union Pacific said, "the fact that none of the cars buckled, that not a single window was broken, even in the car that turned on its side . . . is the most remarkable demonstration of strength of equipment I've ever seen."

Daily Chicago-Miami Streamlined Service Inaugurated

On December 17, 18 and 19, three groups of railroads inaugurated daily service with three new streamlined coach trains on a 29½ hr. schedule between Chicago and Miami, Fla. The service operates over three different routes and each train departs from Chicago every third day, providing daily departures. The first train to make the run on December 17, known as the Dixie Flagler, is owned by the Florida East Coast and operates over the Chicago & Eastern Illinois; the Louisville & Nashville; the Nashville, Chattanooga & St. Louis; the Atlanta, Birmingham & Coast; the Atlantic Coast Line and the Florida East Coast. The second train, the City of Miami, owned by the Illinois Central, left Chicago on its initial run on December 18. This train operates over the Illinois Central; the Central of Georgia; the Atlantic Coast Line and the Florida East Coast. The third train, known as the South Wind and owned by the Pennsylvania, left Chicago on its initial run on December 19. It operates over the Pennsylvania; the Louisville & Nashville; the Atlantic Coast Line and the Florida East Coast.

Unions Sue to Force Job Protection in Abandonments

The members of the Railway Labor Executives Association and the Brotherhood of Railroad Trainmen have filed in the United States District Court for the District of Columbia a civil suit against the United States and the Interstate Commerce Commission asking that the order in the Pacific Electric abandonment case be suspended and that the case be remanded to the commission with the specific instruction that the rights of the employees should be considered in passing upon the question of convenience and necessity as regards the abandonment of some 88 miles of lines in the Los Angeles area. It is possible that the suit may be the vehicle by which railroad labor will test the opinion of the courts on the rights of labor in abandonments.

I. C. C. Publishes Construction Guide Prices

On December 20, the Interstate Commerce Commission's Bureau of Valuation released a 54-page compilation of railroad construction price guides recently completed by its engineering section. The guide prices are set forth by account numbers and are given in year-by-year detail for the period from 1928 to 1939 inclusive; for comparative purposes, the average for 1910 to 1914 inclusive, the base period for the determination of construction prices in valuation proceedings, is also given. Guide prices are also set forth separately for each of eight geographical districts into which the country is divided along the line of general comparability of construction costs. This information is issued in addition to the regular annual report on railroad construction indices, showing price trends and relationships.

Refuses to Void Anti-Trust Suit Against A.A.R.

Justice Jennings Bailey of the District Court of the United States for the District of Columbia has refused to dismiss the government's anti-trust action against the Association of American Railroads, its members and officers. The case, which was filed by the Department of Justice on October 25, 1939, was instituted under provisions of the Sherman Act and charged that the railroads had violated the law by refusing to enter into through routes and joint rates with motor carriers. In oral argument on the motion of the A.A.R. to dismiss the suit, Frank Coleman, special assistant to the attorney general, emphasized the fact that the government was interested only in the question of whether the railroads actually intended to enter into through routes and joint rates with motor carriers and told the court that the conspiracy might still exist secretly, even though there were no written evidence of it. He suggested several forms of action that the court might take, but asked that the anti-trust suit not be dismissed. The next step in the controversy will be for the railroads to answer the original complaint of the government within 20 days.

Personal Mention

General

Curtiss E. Crippen, assistant engineer on the Chicago, Milwaukee, St. Paul & Pacific at Chicago, has been appointed fuel inspector, with the same headquarters.

S. M. Garrigues, supervisor of track on the Lehigh Valley at Jersey City, N. J., has been promoted to transportation inspector, with headquarters at Wilkes-Barre, Pa.

P. B. Snider, assistant division engineer of the Hocking division of the Chesapeake & Ohio, with headquarters at Columbus, Ohio, has been promoted to assistant trainmaster of the same division at the same point, effective December 7.

T. D. Williams, track supervisor on the Louisville & Nashville at Latonia, Ky., has been appointed assistant trainmaster at Hazard, Ky. Mr. Williams entered the service of the L. & N. on January 8, 1926, as an instrumentman on the Louisville division and in November, 1937, was promoted to assistant engineer on the Cincinnati division. On April 1, 1940, he was appointed track supervisor at Hazard.

O. M. Dawson, superintendent of the Scioto division of the Norfolk & Western, with headquarters at Portsmouth, Ohio, and a maintenance officer by training and experience, has been promoted to general superintendent of the Eastern General division, with headquarters at Roanoke, Va. Mr. Dawson entered the service of the Norfolk & Western as a laborer in the motive power department at Bluefield, W. Va., in June, 1911, working there during summer months for the next five years while attending college. In 1916 he was regularly employed as a chainman in the engineering department at Roanoke and held that position until

O. M. Dawson

May, 1917, when he entered military service. Following the war, he was re-employed as a boilermaker and in August, 1923, was transferred to the Radford division as assistant roadmaster. A year later he was transferred to the Scioto division. Mr. Dawson was promoted to roadmaster on the Shenandoah division in January, 1927, later serving as assistant superintendent of the Shenandoah, Radford, Scioto and Pocahontas divisions, successively. In July, 1938, he was promoted to superintendent of the Pocahontas division, and on January 1, 1940, he was transferred to the Scioto division.

J. B. Jones, assistant superintendent of freight transportation of the Central region of the Pennsylvania, with headquarters at Pittsburgh, Pa., and an engineer by training and experience, has been promoted to superintendent of the Indianapolis division, with headquarters at Indianapolis, Ind. Mr. Jones was born at Danville, Ill., on March 22, 1905, and graduated in civil engineering from the University of Illinois in 1926. He entered railway service on July 1, 1926, as a rodman on the Chicago & Eastern Illinois and on April 1, 1927, he went with the Pennsylvania as an assistant on the engineering corps of the Logansport division. On July 16, 1929, he was appointed an assistant supervisor of track on the Cumberland Valley division, with head-

J. B. Jones

quarters at Chambersburg, Pa., later serving in that capacity on the Middle division, the Baltimore division and the Philadelphia division. Mr. Jones was promoted to track supervisor on the Williamsport division on February 20, 1934, being transferred to the Baltimore division, with headquarters at Washington, D. C., on June 1, 1934. On January 1, 1935, he was transferred to the New York division with headquarters at New York, and was promoted to division engineer of the St. Louis division on January 16, 1939. On January 16, 1940, he was advanced to assistant superintendent of freight transportation of the Central region, with headquarters at Pittsburgh, Pa., the position he held until his recent promotion.

L. C. Ayers, general superintendent of the Eastern General division of the Norfolk & Western at Roanoke, Va., and a maintenance officer by training and experience, has been promoted to assistant general manager, with the same headquarters. Mr. Ayers was born at Oak Level, Va., on April 8, 1875. He began his railroad career in September, 1890, as a water boy on the Roanoke & Southern (one of the predecessor lines of the Norfolk & Western), at Roanoke. From 1892 to February, 1895, he served on the Radford division successively as timekeeper, track watchman, section laborer,

L. C. Ayers

freight brakeman and work train flagman. From February, 1895, to 1901, he worked on the Scioto division (then known as the Kenova division) as section foreman, extra gang foreman and work train foreman. In 1901 he was promoted to roadmaster on the Cincinnati and Kenova districts. Mr. Ayers was promoted in 1906 to general supervisor of maintenance and structures on the Scioto division and was appointed superintendent of construction on the same division in 1909. During the period from 1912 to 1923 he held the positions of superintendent of construction on the Scioto division and assistant division superintendent on the Scioto, Pocahontas and Norfolk divisions. On February 16, 1923, he was promoted to superintendent of the Shenandoah division at Roanoke, and on October 1, 1934, Mr. Ayers became general superintendent of the Eastern General division at Roanoke, the position he held until his recent promotion to assistant general manager.

Engineering

H. R. Younger, division superintendent on the British Columbia district of the Canadian Pacific at Penticton, B.C., has been appointed district engineer of the Alberta district, with headquarters at Calgary, Alta., succeeding **T. Lees.**

T. E. Price, division engineer on the Canadian Pacific at Vancouver, B.C., has been promoted to district engineer of the Manitoba district, with headquarters at Winnipeg, Man., succeeding **J. C. Holden,** who retired on December 31.

W. J. Lank, division engineer on the Kansas City Southern at Kansas City, Mo., has been appointed acting division engineer of the Southern division, with headquarters at Shreveport, La., succeeding **P. J. McCarthy,** who has been granted a leave of absence.

G. H. Fair has been appointed assistant division engineer on the Southern Pacific, with headquarters at Portland, Ore., succeeding **Roy W. Putnam,** whose promotion to division engineer of the Rio Grande division, with headquarters at

El Paso, Tex., was announced in the November issue.

O. E. Hager, assistant bridge engineer of the New York, Chicago & St. Louis (Nickel Plate), with headquarters at Cleveland, Ohio, has been appointed engineer of bridges and structures of the Pere Marquette, with headquarters at Detroit, Mich., succeeding **Charles S. Sheldon,** who retired on December 15.

K. E. Moore, assistant engineer on the New York Central System (Big Four) at Springfield, Ohio, has been appointed assistant engineer in the office of the district engineer at Cincinnati, Ohio, a newly created position, and **R. F. Lawson** has been appointed assistant engineer at Springfield, succeeding Mr. Moore.

C. F. Edwards, supervisor of track of the Columbus Terminal of the Chesapeake & Ohio, with headquarters at Columbus, Ohio, has been promoted to assistant division engineer of the Hocking division with the same headquarters, effective December 16, succeeding **P. B. Snider,** whose appointment as assistant trainmaster is noted elsewhere in these columns.

Charles W. Pitts, division engineer on the Union Pacific, with headquarters at Denver, Colo., has been promoted to assistant to the chief engineer, with headquarters at Omaha, Neb. **W. H. Lowther,** division engineer at Spokane, Wash., has been transferred to Denver, succeeding Mr. Pitts and **E. F. Kidder,** assistant engineer at Omaha, has been appointed division engineer at Spokane, replacing Mr. Lowther.

W. N. Wilson, resident engineer on the New York Central System (Big Four) at Cincinnati, Ohio, has been promoted to assistant division engineer of the Illinois division, with headquarters at Mattoon, Ill., succeeding **W. H. Miesse,** whose promotion to division engineer, with headquarters at Springfield, Ohio, was announced in the December issue. The position of resident engineer at Cincinnati has been abolished.

Henry W. Fenno, engineer maintenance of way on the New York Central lines west of Buffalo and the Ohio Central lines, with headquarters at Cleveland, Ohio, has retired, and **Lynn B. Holt,** engineer of track, with headquarters at Cleveland, has been appointed assistant district engineer, with the same headquarters. The positions of engineer maintenance of way and engineer of track at Cleveland have been abolished.

W. J. Strout, acting chief engineer of the Bangor & Aroostook, has been appointed chief engineer, with headquarters as before at Houlton, Me. **J. W. Wiggins,** superintendent of bridges and buildings, has been appointed principal assistant engineer, succeeding Mr. Strout, who has been serving as acting chief engineer since the death of **Parker C. Newbegin** on January 22, 1940. **R. H. Morrison** has been appointed superintendent of bridges and buildings, relieving Mr. Wiggins.

R. A. Gravelle, former assistant engineer and for the last few months field representative in the industrial department of the Grand Trunk Western, has been promoted to engineer maintenance of way, with headquarters at Detroit, Mich., succeeding to the duties of **Frank A. Tranzow,** superintendent of track, whose retirement on October 31 was announced in the December issue. **A. W. Van Riper** has been appointed assistant engineer, with headquarters at Detroit, replacing Mr. Gravelle.

Ralph E. Patterson, assistant to the chief engineer of the Lehigh Valley, has been promoted to the newly-created position of engineer maintenance of way, with headquarters as before at Bethlehem, Pa., and the position of assistant to the chief engineer has been abolished. Mr. Patterson was born at Bangor, Me., on March 9, 1889, and was graduated in civil engineering from the University of Maine in 1911. He entered railroad service in October, 1912, with the Lehigh Valley, serving on the engineering corps at Buffalo, N. Y. In 1916 he became assistant engineer at Buffalo and from 1920 to 1927 he served as division engineer at Hazleton, Pa., being transferred to Sayre, Pa., in 1927 and to Easton, Pa., in 1929. Mr. Patterson was appointed assistant to the chief engineer at Bethlehem in 1937 the position he held until his recent appointment as engineer maintenance of way, effective December 1.

L. W. Walter, inspecting engineer on the Erie at Jersey City, N. J., retired from active service on December 31. Except for a period during the World War, Mr. Walter had been in the service of the Erie for the last 35 years and during this entire period his activities had been concerned with the field of cement and concrete. He was born in Dearborn county, Ind., and during his early career he served as county surveyor of this county and as city engineer of Aurora, Ind. Later he entered the service of the Baltimore & Ohio, and in 1905 he joined the Erie, where he served successively as cement inspector, assistant engineer and inspecting engineer, holding the latter position until his retirement. During 1918 and 1919, Mr. Walter represented the United States Shipping Board Emergency Fleet Corporation on the construction of the corporation's first concrete ship. Mr. Walter has been active in committee work in the American Society for Testing Materials and the American Railway Engineering Association.

Otis Weeks, whose retirement as division engineer of the Salt Lake division of the Southern Pacific, with headquarters at Ogden, Utah, was announced in the November issue, was born at Wakefield, Mass., on April 8, 1875, and graduated from the University of Nebraska in 1895. He entered railway service in June, 1895, as a section laborer on the Boston & Maine at Newburyport, Mass., and later served as a section laborer and foreman at various locations on the Eastern division of that road. In June, 1897, he went with the Maine Central as assistant roadmaster at Bangor, Me., and in July, 1899, he went with the Union Pacific as roadmaster at Junction City, Kan., later being transferred to Oakley, Kan., and Kansas City, Mo. Mr. Weeks was promoted to division engineer, with headquarters at Denver, Colo., in June, 1905, and in March, 1907, he went with the Grand Trunk Pacific (now part of the Canadian National) as track engineer with headquarters at Portage La Prairie, Man. In November, 1908, he left railway service to accept employment with the Utah Copper Company at Bingham Canyon, Utah, and in May, 1911, he went with the Southern Pacific as a general foreman, being promoted to assistant engineer on the Western division two months later. Mr. Weeks was advanced to division engineer, with headquarters at Stockton, Cal., in February, 1913, and seven months later he was transferred to Ogden, which position he held continuously, with the exception of a period in 1918 and 1919 when he was in the U. S. Army, until his retirement on November 1.

Newton Wells McCallum, assistant chief engineer of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh, Pa., has been promoted to chief engineer, with the same headquarters, succeeding **Rudolf P. Forsberg,** who retired as chief engineer of the P. & L. E. and its subsidiaries on November 30. A biographical sketch of Mr. McCallum's railway career was published in the December issue, in connection with his appointment as assistant chief engineer. **Charles G. Stewart,** engineering draftsman, has been appointed assistant chief engineer to succeed Mr. McCallum.

Mr. Forsberg was born at Lynchburg, Va., on November 27, 1870, and took a private technical course in Pittsburgh, Pa.

He entered railroad service in June, 1887, as a rodman on the Lynchburg & Durham (now part of the Norfolk & Western), and in 1888 he went with the Richmond & Danville (now part of the Southern), later being promoted to levelman and transitman. During the construction of the Yadkin division in 1890

Rudolf P. Forsberg

and 1891 he was resident engineer, with office at Salisbury, N. C. In 1891 he took a position as draftsman in the office of an architect at Richmond, Va., but returned to railway service the following year as a draftsman in the office of the engineer of maintenance of way of the Norfolk & Western at Roanoke, Va. In September, 1892, he went with the Pittsburgh & Lake Erie as a draftsman in the office of the engineer maintenance of way at Pitts-

burgh, Pa., later being transferred to the office of the chief engineer. He was promoted to chief draftsman in March, 1899, to assistant engineer in 1902, and to special engineer in July, 1919. On March 1, 1920, he was made principal assistant engineer, and since July 1, 1931, has been chief engineer of the Pittsburgh & Lake Erie, the Lake Erie & Eastern, the Pittsburgh, Chartiers & Youghiogheny and the Monongahela. Mr. Forsberg has been active in numerous railroad and engineering organizations, serving as president of the Railway Club of Pittsburgh in 1935-36; president of the Pittsburgh Section of the American Society of Civil Engineers in 1937-38; and chairman of the Civil Section of the Engineers' Society of Western Pennsylvania in 1927.

Mr. Stewart was born at Hockingport, Ohio, on November 27, 1885. He graduated from Ohio University in 1910 and received his civil engineering degree from Cornell University in 1912. He entered railroad service on October 1, 1912, as an assistant on the engineering corps of the Pennsylvania at Cleveland, Ohio. From November, 1916 to March, 1923, he was employed by the Baltimore & Ohio, serving successively as assistant supervisor at Walkerton, Ind., assistant district engineer at Cincinnati, Ohio, and assistant division engineer at Flora, Ill., and Washington Ind. He was engineer maintenance of buildings for the Jones & Laughlin Steel Corporation at its South Side Works, Pittsburgh, Pa., from March, 1923, to April, 1925 and from the latter date to January 1927 he was identified with the real estate business. In January 1927, Mr. Stewart was appointed an engineering draftsman for the Pittsburgh & Lake Erie at Pittsburgh, and served in this capacity until his recent promotion to assistant chief engineer, effective December 1.

Charles G. Stewart

Track

B. E. Valde, instrumentman on the Canadian National at Smithers, B. C., has been promoted to roadmaster, with headquarters at Burns Lake, B. C., succeeding **O. Palumbo,** deceased.

J. L. Southard has been appointed supervisor of track of the Columbus Terminal of the Chesapeake & Ohio, with headquarters at Columbus, Ohio, effective December 16, to succeed **C. F. Edwards,** whose appointment as assistant division engineer is noted elsewhere in these columns.

Arthur J. Johnson, assistant roadmaster on the Chicago & North Western at Chicago, has been promoted to roadmaster, with headquarters at Redfield, S.D., succeeding **Thomas H. McDermott,** who retired on January 1. **Harold C. Miracle,** assistant roadmaster at Milwaukee, Wis., has been transferred to Chicago, relieving Mr. Johnson, and **Thomas G. Mingus,** assistant section foreman on the Galena division, has been promoted to assistant roadmaster at Milwaukee, replacing Mr. Miracle.

James J. O'Hara, whose retirement as roadmaster on the Southern Pacific, with headquarters at Oakland Pier, Cal., was announced in the November issue, was born in Ireland in July, 1873, and entered railway service on the Southern Pacific in October, 1897, as a track laborer, later being promoted to assistant foreman. In January, 1900, he was advanced to section foreman, later being promoted to extra gang foreman and general foreman. Mr. O'Hara was promoted to roadmaster in June, 1911.

John Check, district roadmaster on the Great Northern, with headquarters at Williston, N.D., has been promoted to division roadmaster, with headquarters at Minot, N.D., succeeding **Charles Sundstrom,** who retired on November 1. **M. Rasmussen** has been appointed district roadmaster at Williston replacing Mr. Check. **Lloyd LaFountaine,** assistant master carpenter of the Minot division, with headquarters at Minot, has been appointed district roadmaster, Berthold and Stanley branches, with headquarters at Berthold, N.D.

William Melvin Paige, whose promotion to roadmaster on the Canadian National, with headquarters at Edmonton, Alta., was announced in the November issue, was born at Drummondville, Que., in May, 1892, and entered railway service in 1909, on the Grand Trunk Pacific (now part of the Canadian National). In August, 1909, he went with the Canadian Northern (now also part of the Canadian National), as a bridge carpenter at Vermilion, Alta. In October, 1915, Mr. Paige was promoted to bridge and building foreman, with headquarters at Edmonton, the position he held until his recent promotion.

Howard F. Larson, whose promotion to roadmaster on the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Mitchell, S.D., was announced in the November issue, was born at Red Wing, Minn., on February 9, 1906, and entered railway service on August 10, 1924, as a section laborer on the Milwaukee at Red Wing. In 1928, he transferred to Farmington, Minn., and worked as a brakeman at that point until 1931, when he returned to Red Wing. In 1933, Mr. Larson was promoted to assistant foreman on extra gangs and since 1937, he has served as section foreman at Frontenac, Minn., and as extra gang foreman on the La Crosse and River divisions.

William Walter Crowley, supervisor of track on the Lehigh Valley, with headquarters at Sayre, Pa., has been promoted to the newly-created position of general inspector of maintenance, with headquarters at Bethlehem, Pa. Mr. Crowley was born at Farmington, N. Y. He entered railroad service with the Lehigh Valley on June 1, 1912, as a track laborer and served in that capacity until April 1, 1916, when he was appointed rail inspector. Mr. Crowley became a section foreman on November 18, 1918, subsequently becoming an extra gang foreman. From February 1 to July 15, 1929, he was assistant track supervisor, becoming track supervisor on the latter date and serving in that capacity until his recent appointment.

J. E. Crowley, assistant supervisor of track on the Lehigh Valley, with headquarters at Jersey City, N. J., has been promoted to supervisor of track, with headquarters at Towanda, Pa., to succeed **D. Oakes,** who has been transferred to Sayre, Pa., to replace **W. W. Crowley,** whose appointment as general inspector of maintenance is noted elsewhere in these columns. **J. B. Baker,** assistant engineer at Wilkes-Barre, Pa., has been promoted to assistant supervisor of track at Jersey City, N. J., to succeed J. E. Crowley. **William Dillon,** a track foreman at Easton, Pa., has been promoted to assistant supervisor of track, with headquarters at Lehighton, Pa., to succeed **G. R. Gallagher,** who has been granted a leave of absence to serve with the Bethlehem Steel Company.

John J. Kennedy, whose promotion to roadmaster on the Southern Pacific, with headquarters at Dunsmuir, Cal., was announced in the November issue, was born at Ogden, Utah, on April 17, 1904, and entered railway service on November 1, 1922, as a boiler maker helper on the Southern Pacific at Ogden. In March, 1923, he became an extra gang timekeeper and in October 1923, he was appointed maintenance of way clerk in the division engineer's office at Ogden. Mr. Kennedy later served successively as an extra gang timekeeper and assistant extra gang foreman on the Salt Lake division, roadmaster's clerk at Winnemucca, Nev., and assistant extra gang foreman, section foreman and extra gang foreman on the Salt Lake division.

Fred M. Schaumburg, whose promotion to division roadmaster on the Northern Pacific, with headquarters at Glendive, Mont., was announced in the November issue, was born at Jamestown, N.D., on April 15, 1897, and studied a correspondence course in railroad engineering. He entered railway service on October 3, 1912, on the Northern Pacific as a section laborer at Jamestown and on February 17, 1916, he was promoted to section foreman at Buchanan, N.D. Mr. Schaumburg was promoted to extra gang foreman on June 18, 1917, and served in that capacity and as a section foreman until February 1, 1934, when he was promoted to track supervisor at Fargo, N.D. On February 1, 1936, he was advanced to roadmaster, with headquarters at Mandan, N.D., the position he held until his promotion.

Lee Roy Adams, whose promotion to

roadmaster on the Southern Pacific, with headquarters at Douglas, Ariz., was announced in the November issue, was born at Beckville, Tex., on May 12, 1898, and entered railway service on September 26, 1917, as a section laborer on the El Paso & Southwestern (now part of the Southern Pacific). On February 19, 1918, he was promoted to apprentice foreman at Carrizozo, N.M., and on May 1, 1918, he was advanced to section foreman at Temporal, N.M. On July 27, 1920, Mr. Adams went with the Arizona Eastern (now part of the Southern Pacific) at Calva, Ariz., returning to the E. P. & S. W. as a section foreman on January 20, 1921. Mr. Adams continued as a section foreman, tie tamping machine foreman and extra gang foreman on the Bisbie district of the Southern Pacific after the E. P. & S. W. was merged with that road. His promotion was effective October 1.

Everett E. Earl, whose promotion to general track supervisor on the Southern Pacific, with headquarters at San Francisco, Cal., was announced in the November issue, was born at Drain, Ore., on May 23, 1888, and entered railway service in 1908, as a chainman on construction on the Southern Pacific, later being promoted successively to rodman and transitman. In 1917, he was promoted to assistant engineer in the maintenance of way department and in 1921, he was advanced to roadmaster, with headquarters at Klamath Falls, Ore. Mr. Earl was transferred to Marysville, Cal., in 1923, and two years later he was appointed terminal trainmaster at Los Angeles, Cal. In 1939, he was appointed construction superintendent on the relocation of the main line around the Shasta dam reservoir, with headquarters at Redding, Cal. His appointment as general track supervisor was effective October 1.

Theodore M. Curtis, whose promotion to roadmaster on the Sedalia division of the Missouri-Kansas-Texas, with headquarters at Parsons, Kan., was announced in the December issue, was born at Dennard, Ark., on August 5, 1893, and entered railway service on October 27, 1908, as a section laborer on the Missouri & North Arkansas (now the Missouri & Arkansas). On June 27, 1913, he was promoted to section foreman and on May 1, 1917, he joined the U. S. Army, serving overseas in France. Upon his return on August 1, 1919, he went with the Missouri Pacific as a section foreman, resigning on January 1, 1920, to become a foreman in charge of track and bridge construction and maintenance for Malery & Beason Company. On September 15, 1921, Mr. Curtis went with the Katy as a section foreman, serving in that capacity and as an extra gang foreman until his recent promotion.

T. M. Goodfellow, supervisor of track in the office of the chief engineer of the Eastern region of the Pennsylvania at Philadelphia, Pa., has been transferred to Harrisburg, Pa., to succeed **J. P. Hiltz,** who has been transferred to the office of the vice-president and comptroller. The following assistants on the engineering corps of the Pennsylvania have been promoted to assistant supervisors of track on the Eastern region: **A. S. Deaner,** York, Pa.; **E. E. Zacharias,** Northumberland, Pa.; **P. S. Settle,** Spangler, Pa.; **K. Leiber,** Columbus, Ohio; **S. Shumate,** Jersey City, N. J.; **M. S. Fleming,** Cresson, Pa.; and **D. C. Hastings,** Harrisburg. **W. L. Turner,** an assistant on the engineering corps on the Central region, has been promoted to assistant supervisor of track at Lock Haven, Pa. to succeed **N. Olsen,** who has been transferred to East Liberty, Pa. **L. F. Shields,** assistant supervisor of track at Harrisburg, has been transferred to Newport, Pa.

Ralph C. Billet, whose promotion to supervisor of track on the Ohio Central lines of the New York Central, with headquarters at Bucyrus, Ohio, was announced in the November issue, was born at Edison, Ohio, on June 1, 1883, and entered railway service on February 1, 1901, as a section laborer on the Toledo & Ohio Central (now part of the New York Central), at Edison. In April, 1905, he went with the Cleveland, Cincinnati, Chicago & St. Louis (Big Four) at Edison as a section laborer and in April, 1906, he returned to the Toledo & Ohio Central as a section laborer. A year later, Mr. Billet became a section foreman on the Big Four at Berea, Ohio, and on June 5, 1907, he returned to the Toledo & Ohio Central as section foreman at Edison. On May 1, 1926, he was promoted to track supervisor, with headquarters at Fostoria, Ohio, and on June 8, 1932, when that position was abolished he returned to Edison as section foreman. On August 1, 1939, Mr. Billet was advanced to assistant supervisor of track, with headquarters at Cleveland, Ohio, the position he held until his promotion on October 1.

Henry Martin Fox, whose retirement as supervisor of track on the Ohio Central lines of the New York Central, with headquarters at Bucyrus, Ohio, was announced in the November issue, was born near Pomeroy, Ohio, on September 4, 1870, and entered railway service on December 1, 1887, as an extra gang laborer on the Kanawha & Michigan (now part of the New York Central), later being transferred to section laborer at Albany, Ohio. He was promoted to section foreman at Trimble, Ohio, on June 16, 1892, and on July 5, 1893, he went with the Toledo & Ohio Central (now part of the New York Central), as a section laborer at Glouster, Ohio. On October 1, 1893, Mr. Fox was promoted to assistant section foreman at the Corning (Ohio) yards and two months later he was advanced to section foreman at New Lexington, Ohio. On March 1, 1908, he was promoted to supervisor of track at Bucyrus, Ohio, and on May 15, 1909, he was transferred to Marion, Ohio, on the Hocking Valley (then under the same management, now part of the Chesapeake & Ohio). Mr. Fox returned to Bucyrus as supervisor of track on the Ohio Central lines of the New York Central on March 1, 1911.

Bridge and Building

Clifford O. Sathre has been appointed assistant supervisor of bridges and buildings on the Galena division of the Chicago & North Western, succeeding **John Tinnes,** who retired on January 1.

Frank William Welbourn, bridge and building foreman on the Canadian Pacific at Moose Jaw, Sask., has been promoted to bridge and building master, with the same headquarters, succeeding **R. Sinclair,** who retired on November 1.

Malcolm A. Beringer, whose promotion to supervisor of bridge and buildings on the Illinois Central, with headquarters at Vicksburg, Miss., was announced in the November issue, was born at Unionville, Pa., on December 11, 1901, and attended Pennsylvania State College in 1917 and 1918, and took night school courses in 1923 and 1924. He entered railway service in the summer of 1917 as a clerk on the Pennsylvania at Tyrone, Pa., serving in that capacity again in the summer of 1918, and during the summer of 1920 he worked in the maintenance of way department of the Chicago, Milwaukee, St. Paul & Pacific at Ottumwa, Iowa. In September, 1920, he became a bridge and building helper on the El Paso division of the Southern Pacific and on February 3, 1921, he went with the Illinois Central as a bridge and building helper on the Vicksburg division. Mr. Beringer was promoted to assistant bridge and building foreman on June 6, 1923, and to bridge and building foreman on October 27, 1924, holding the latter position until his recent promotion, which was effective September 9.

Obituary

Colonel Lincoln Bush, chief engineer of the Delaware, Lackawanna & Western from 1903 to 1909 and designer of the so-called Bush platform shed for use at large passenger stations, died at his home in East Orange, N. J., on December 11, after a short illness, at the age of 79. Born in Illinois in 1861, Mr. Bush graduated in civil engineering from the University of Illinois and entered railroad service in 1888 with the Union Pacific as assistant engineer maintenance of way on the Wyoming division, becoming an assistant engineer on location for the Pacific Short Line one year later. For several years he interrupted railroad service to instruct in descriptive geometry at the University of Illinois; served as assistant engineer with E. L. Corthell in bridge work at Chicago; as chief draftsman, designer and estimator with the Pittsburgh Bridge Company and as a draftsman with the Chicago Drainage Canal. In 1896 Mr. Bush returned to railroad service with the Chicago & North Western as assistant to the bridge engineer at Chicago, becoming acting division engineer of the Iowa division in 1899. Later that year he went with the Delaware, Lackawanna & Western as bridge engineer, subsequently becoming principal assistant engineer in 1900 and chief engineer in 1903. In 1909 Mr. Bush left the Lackawanna to engage in private practice as a consulting engineer in New York. During the World War he served with the United States War Department and the Army, becoming Colonel, Quartermasters Corps. In 1919 he resumed private practice in New York and in 1920 became president of Bush, Roberts and Schaefer, continuing active therein until his retirement several years ago.

Association News

Maintenance of Way Club of Chicago

Why A Longer Tie? was the subject considered at the December 16 meeting of the club, which, following dinner at 6:30 p.m., with 105 members and guests in attendance, was addressed by F. S. Hewes, office engineer of the Atchison, Topeka & Santa Fe. In his address, Mr. Hewes dealt comprehensively with the fundamentals of crosstie dimensions and spacing, and discussed the various considerations which led the Santa Fe to adopt a 9-ft. tie for all of its important main tracks between Chicago and Los Angeles, Cal.

The meeting on January 27 will be addressed by A. E. Perlman, engineer maintenance of way of the Denver & Rio Grande Western, who will discuss the possibilities of work equipment under the topic, Getting the Most Out of Work Equipment.

Metropolitan Maintenance of Way Club

With about 100 members and guests in attendance, the December meeting of the club was held at the Hotel Governor Clinton, New York at noon on December 12. Following luncheon, the meeting was addressed by Col. A. L. Bartlett, engineer maintenance of way, New York, New Haven & Hartford, who described the strip-welding method of building up battered rail ends. Col. Bartlett first dealt with the metallurgical aspects of strip welding and then described the experiences of his company with the process. The program also included a demonstration, presented under the auspices of the Rail Joint Company, of the Polariscope, a device by means of which stress patterns of loaded structural members are determined by passing polarized light through transparent models made from plastics.

At its next meeting, which has been tentatively scheduled for February 13, the club will be addressed by P. O. Ferris, chief engineer, Delaware & Hudson, who will describe the experiences of his company with the maintenance of continuous butt-welded rail.

Track Supply Association

The directors met in Chicago on December 13 to receive final reports of the work of the last year culminating at the exhibit presented during the convention of the Roadmasters' Association in Chicago last September. These reports showed an increase of 20 per cent in the number of exhibitors as well as greatly increased attendance of railway officers at the exhibit and at the annual banquet, the registration of visitors at the exhibit approximating that of 1929, the highest previously recorded attendance. The officers expressed appreciation to retiring President R. J. McComb (Woodings-Verona Tool Works) and his committees.

President E. C. Argust (Morden Frog and Crossing Works) appointed chairmen of committees for the September, 1941, exhibition as follows:

Publicity Committee—R. J. McComb (Woodings-Verona Tool Works)

Entertainment Committee—H. M. McFarlane (O. F. Jordan Company)

Membership Committee—George W. Morrow (Reade Manufacturing Company)

Hotel Committee—R. M. Blackburn (The Buda Company)

Roadmasters' Association

The Executive Committee met in Chicago on December 14 with President J. J. Clutz, Vice-Presidents A. B. Hillman and E. L. Banion, Secretary F. O. Whiteman, Treasurer E. E. Crowley, Executive Committee Members H. E. Kirby, E. J. Brown and C. M. Burpee, and Past President Elmer T. Howson present.

After considering the status of finances and of membership, a report was received from the committee appointed to review the format for the proceedings, which recommended the more liberal use of photographs and other measures to improve the appearance of this volume, which recommendations were accepted. Efforts are to be made also to compile an index for all of the proceedings to date for inclusion in the 1945 volume.

The committee voted to relieve members serving in the army or the navy from dues during their term of service. The Arrangements committee recommended that arrangements be renewed with the Hotel Stevens, Chicago, for the holding of the convention on September 16-18, 1941. The remainder of the meeting was devoted to the selection of personnel for the committees to study and report on subjects selected at the last convention.

American Railway Engineering Association

As the result of the action of the Nominating committee of the association, the following names will appear on the ballot for officers to be mailed shortly to members: President, F.L.C. Bond, vice-president and general manager, Central region, Canadian National Railways, Toronto, Ont.; vice-president, W. F. Cummings, chief engineer, Boston & Maine, Boston, Mass.; directors (three to be elected), J. F. Pringle, general superintendent, Canadian National Railways, Toronto, Ont.; F. S. Schwinn, assistant chief engineer, Missouri Pacific Lines, Houston, Tex.; R. R. Cummins, general manager, Central of Georgia, Savannah, Ga.; H. A. Aalberg, assistant chief engineer, Chicago, Burlington & Quincy, Lincoln, Neb.; B. R. Kulp, chief engineer, Chicago & North Western, Chicago; L. C. Frohman, chief engineer, Florida East Coast, St. Augustine, Fla.; Elmer T. Howson, vice-president and editor, *Railway Engineering and Maintenance*, Chicago; W. B. Irwin, assistant to vice-president, Great Northern, St. Paul, Minn.; and H. F. Brown, assistant electrical engineer, New York, New Haven & Hartford, New Haven, Conn.

In addition to the above names to be balloted upon, H. R. Clarke, engineer maintenance of way of the Chicago, Burlington & Quincy, Chicago, will be advanced automatically to senior vice-president.

Bulletin No. 421 was mailed to members late in December, containing the reports of the committees on Buildings; Water Service, Fire Protection and Sanitation; Yards and Terminals; Highways; Co-operative Relations with Universities; Economics of Railway Labor; and Maintenance of Way Work Equipment. Bulletin No. 422 will be mailed to members during January and will include the reports of the committees on Wood Bridges and Trestles; Masonry; Iron and Steel Structures; Impact; Records and Accounts; and Waterproofing of Railway Structures.

With the year's work of the committees so nearly completed, only three committees held meetings during December, and no committees have scheduled meetings during January. In fact, only two of the committee reports to be presented before the annual convention in March have not been completed and placed in the hands of the secretary. The meetings held in December were those of the Committee on Water Service, Fire Protection and Sanitation, at New York on December 2; the Committee on Track, at Chicago on December 5; and the Committee on Rail, at New York on December 11.

Bridge and Building Association

A meeting of the Executive committee was held in Chicago on December 9 with President H. M. Church, Vice-Presidents R. E. Dove and F. H. Soothill, Secretary F. O. Whiteman, Treasurer F. E. Weise, Directors K. L. Miner, I. A. Moore, R. E. Caudle, Neal D. Howard and W. A. Sweet and Past Presidents A. E. Bechtelheimer, C. M. Burpee and Elmer T. Howson present.

A committee was appointed to consider the status of delinquent members and to recommend action. It was voted to remit the dues of members serving in the army or the navy. The committee voted to hold the next convention on October 14-16, 1941, and authorized the Arrangements Committee to conclude negotiations with the Hotel Stevens, Chicago.

A report was received from a committee appointed to investigate the possibility of revising the format for the proceedings, which committee recommended a number of changes in page arrangement that were approved.

The president was authorized to appoint a committee to study the question of junior membership, this committee to report at the next meeting of the Executive committee. The committee then devoted the remainder of the day to the selection of members to investigate and report on subjects selected for consideration at the next convention.

Wood-Preservers' Convention

The American Wood-Preservers' Association will hold its thirty-seventh annual meeting at Louisville, Ky., on February 4-6. The following features of the program are of special interest to railway men.

Tuesday, February 4
Morning Session—10:30 a.m.

Address of welcome, by J. B. Hill, president, Louisville & Nashville

Address of President (Ralph E. Meyers, vice-president and sales manager, International Creosoting & Construction Company)

Report of Committee on Preservatives

Afternoon Session—1:30 p.m.

Service Records for Wolmanized Lumber
Report of Special Committee on Painting of Creosoted Wood
Report of Special Committee on Revision and Co-ordination of Treatment Standards
Report of Committee on Pressure Treatment of Oak Ties and Lumber
Report of Joint Committee on Douglas Fir —Pressure Treatment
Report of Committee on Pressure Treatment of Southern Pine Ties and Lumber
Report of Committee on Pressure Treatment of Southern Pine Piles
Report of Committee on Pressure Treatment of Poles

Wednesday, February 5

Morning Session—9:00 a.m.

Report of Committee on Inspection
Report of Committee on Pole Service Records
Address on Thirty-One Years' Experience with Treated Ties on the Lehigh Valley, by A. N. Williams, president, Lehigh Valley
Address on Uses of Treated Timber and Ties by the Louisville & Nashville, by L. L. Adams, engineer maintenance of way, Louisville & Nashville
Address on Revising Burlington Railroad Bridge Standards to Reduce Preframing of Creosoted Timber, by G. A. Haggander, assistant chief engineer, Chicago, Burlington & Quincy
Report of Committee on Diversified Uses of Treated Wood

Thursday, February 6

Morning Session—9:00 a.m.

Report of Committee on Non-Pressure Treatment of Poles
Report of Committee on Pressure Treatment of Posts
Report of Committee on Tie Service Records
Report of Committee on Bridge and Structural Timber
Report of Committee on Marine Piling Service Records
Report of Committee on Post Service Records

National Railway Appliances Association

Indicating the widespread interest among railway supply manufacturers in the coming annual exhibition of the National Railway Appliances Association, to be held at the International Amphitheatre, Chicago, on March 10-13, coincident with the forty-second annual convention of the American Railway Engineering Association, 69 manufacturers of materials and equipment used in the construction and maintenance of railway tracks, bridges, buildings, fuel and water stations and allied railway facilities, have already arranged for space at the exhibit. This represents a substantial increase in the number of manufacturers contracting for space at this time last year, and, along with inquiries still coming in, and the prospects for a year of largely increased construction and maintenance activities, foretells the largest and most successful exhibition of the association in a number of years.

In view of the size of the amphitheatre, much desirable space for exhibits is still available. Application should be made of C. H. White, secretary (Industrial Brownhoist Corporation), 208 So. LaSalle St., Chicago.

A list of the companies which have arranged to present exhibits to date follows:

Air Reduction Sales Company, New York
American Car & Foundry Co., New York
American Fork & Hoe Co., Cleveland, Ohio
American Hoist & Derrick Co., St. Paul, Minn.
Armco Railroad Sales Company, Middletown, Ohio
Barco Manufacturing Company, Chicago
Buda Company, Harvey, Ill.
Caterpillar Tractor Company, Peoria, Ill.
Chicago Pneumatic Tool Company, Chicago
Chipman Chemical Company, Bound Brook, N. J.
Crerar, Adams & Co., Chicago
Cullen-Friestedt Company, Chicago
Dearborn Chemical Company, Chicago
Dickinson, Inc., Paul, Chicago
Duff-Norton Manufacturing Company, Pittsburgh, Pa.
Eaton Manufacturing Company (Reliance Spring Washer Division), Massillon, Ohio
Elastic Rail Spike Corp., New York
Electric Tamper & Equipment Co., Ludington, Mich.
Fairbanks, Morse & Co., Chicago
Fairmont Railway Motors, Inc., Fairmont, Minn.
Gary Screw & Bolt Co., Pittsburgh, Pa.
Hayes Track Applance Co., Richmond, Ind.
Hogan, Geo. M., Chicago
Homelite Corporation, Port Chester, N. Y.
Hubbard & Co., Pittsburgh, Pa.
Industrial Brownhoist Corp., Bay City, Mich.
Ingersoll-Rand Company, New York
International Harvester Co., Chicago
Jacobsen Manufacturing Co., Racine, Wis.
Johns-Manville, New York
Jordan Company, O. F., East Chicago, Ind.
Joyce-Cridland Co., Dayton, Ohio
Kalamazoo Railway Supply Co., Kalamazoo, Mich.
Lehon Company, Chicago
Lewis Bolt & Nut Co., Minneapolis, Minn.
Lundie Engineering Corp., New York
Maintenance Equipment Co., Chicago
Mall Tool Company, Chicago
Master Builders Company, Cleveland, Ohio
Metal & Thermit Corp., New York
Morden Frog & Crossing Works, Chicago
Morrison Railway Supply Corp., Buffalo, N. Y.
Moto-Mower Company, Chicago
National Aluminate Corp., Chicago
National Lead Co., New York
National Lock Washer Co., Newark, N. J.
Nordberg Manufacturing Co., Milwaukee, Wis.
Oxweld Railroad Service Co., Chicago
P & M Company, Chicago
Philadelphia Steel & Wire Corp., Philadelphia, Pa.
Pocket List of Railroad Officials, New York
Portable Plating & Equipment Co., Chicago
Rail Joint Company, The, New York
Railroad Accessories Corp., New York
Rails Company, The, New Haven, Conn.
Railway Engineering and Maintenance, Chicago
Railway Purchases and Stores, Chicago
Railway Track-Work Co., Philadelphia, Pa.
Ramapo Ajax Division, American Brake Shoe & Foundry Co., New York
Republic Steel Corp., Cleveland, Ohio
Sperry Rail Service, Hoboken, N. J.
Syntron Company, Homer City, Pa.
Teleweld, Inc., Chicago
Templeton, Kenly & Co., Chicago
Timber Engineering Co., Washington, D. C.
United States Steel Corp., Pittsburgh, Pa.
United States Wind Engine & Pump Co., Batavia, Ill.
Woolery Machine Co., Minneapolis, Minn.
Young & Greenawalt, Chicago

Supply Trade News

General

Railway Maintenance Devices, Inc., Chicago, has been organized to handle the manufacture and distribution of Bulldog Sire Tie Pullers and Bulldog Pup Tie Replacers. The new organization succeeds the Welbrom Company, Chicago. **C. L. Welch** is president and **L. I. Johnson,** treasurer, of the new firm. Mr. Welch, formerly with the Illinois Central, later served as district manager of the Chicago branch of Fairbanks, Morse & Company, and then served as a representative of various railroad equipment manufacturers up to the time he developed the Bulldog tie machines.

Stockholders of the **Wood Preserving Corporation,** a Koppers Company subsidiary, at a special meeting at Pittsburgh, Pa., on December 11, voted to liquidate the corporation. Its business will be conducted as an operating and sales division of **Koppers Company** after December 31. The action was taken in order to simplify the Koppers corporate structure and to further integrate operating and sales activities with other divisions of the Koppers Company.

Personal

Arthur W. Steudel has been elected president of the **Sherwin-Williams Company,** succeeding **George A. Martin,** who becomes chairman of the board.

Alex S. Anderson has been appointed district manager for the midwestern territory of the **Duff-Norton Manufacturing Company,** with headquarters at Chicago.

Leon F. Payne has been elected treasurer of the **Carnegie-Illinois Steel Corporation** to succeed **Frank C. Harper** who retired on December 16 after 32 years service with the company.

John L. Hoffman, assistant general superintendent of the **Oxweld Railroad Service Company** at Chicago, has been appointed sales representative in the Southeastern territory, with the same headquarters, succeeding **William M. Leighton,** who retired on December 31.

James F. Fitzgerald has been appointed special representative on railway welding requirements by the **C. D. Hicks Company** of St. Louis, Mo., which company, as announced in the December issue, has been designated sales agent to railways operating in the St. Louis area of arc and spot welders, accessories, rods and electrodes manufactured by the Universal Power Corporation of Cleveland, Ohio.

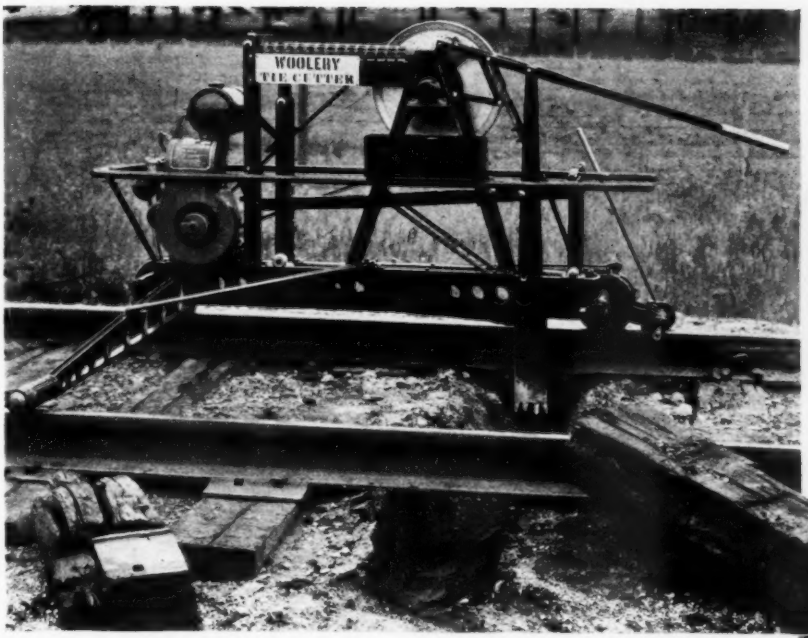
C. N. Thulin, vice-president of the **Duff-Norton Manufacturing Company,** with headquarters at Chicago, has resigned to become manager of railway sales of the Joyce-Cridland Company, Dayton, Ohio. Mr. Thulin entered railway service with the Northern Pacific in 1886 and resigned in 1902 to enter the supply business in St. Paul, Minn. He was employed by the Chicago Pneumatic Tool Company for a number of years and in 1910 became western sales manager of the Duff Manufacturing Company. Later he was elected vice-president of the successor company, the Duff-Norton Manufacturing Company.

Obituary

Walter E. Kasten, treasurer of the O. F. Jordan Company, East Chicago, Ind., died on December 25 at his home in Hammond, Ind.

F. B. Hamerly, vice-president of the **Independent Pneumatic Tool Company** of Chicago, died November 27, of a heart attack, while inspecting the company's plant at Los Angeles, Cal.

★ ★ ★ ★ GO MODERN



In

1941

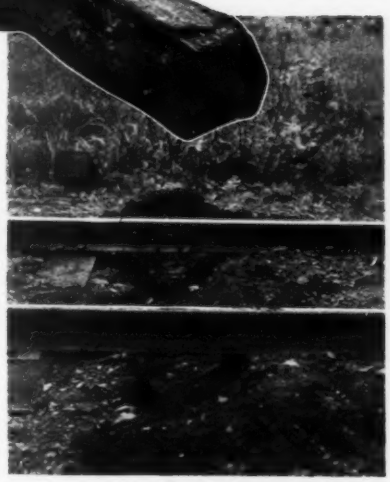
WOOLERY TIE CUTTERS

When programming next spring's work, plan to renew your ties the modern way by equipping your forces with Woolery Tie Cutters and greatly reduce the largest item of expense in your maintenance program.

Last year hundreds of these machines, in use throughout the country, reduced tie renewal costs 30% and completed the work weeks, and even months, ahead of schedule. We would be glad to show you the figures taken from actual experience of roads in the renewal of more than 2,000,000 ties last year.

The work is made easier—retamping is practically eliminated—the compacted bed of the old tie is not disturbed—the track surface is not affected.

WOOLERY TIE CUTTERS *belong* in your 1941 program—they will pay for themselves twice over in a single season. Send for 12-page booklet.



Anticipate this year's possibilities. The efficiency of Woolery Tie Cutters under normal conditions will be of still greater value when the heavier traffic and higher train speeds of 1941 will demand more exacting roadway maintenance.

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

RAILWAY MAINTENANCE EQUIPMENT

TIE CUTTERS • SWITCH HEATERS • MOTOR CARS

RAILWAY WEED BURNERS • BOLT TIGHTENERS

TO RAILWAY SUPPLY MANUFACTURERS

"Another Billion Dollar Market"

"Well, Boss, another year has rolled around."

"Yes, Bill, and it's been a pretty good one, too. *Your* railway business was especially good."

"I'm glad to hear you say that, Boss, for I've felt that I did a pretty good job. I hope that I can do as well next year."

"Do as well, Bill! What do you mean?"

"Why, everything's going into war materials."

"Even so, aren't the railways an essential arm of national defense?"

"You mean that you think they're going to continue buying?"

"Continue, Bill! They're going to *increase* their buying. With the national defense activities and the pick-up in industrial production that is following, there'll be a lot more traffic for them to handle. That'll mean more net earnings. And you know what the railways always do when their earnings increase."

"Yes, Boss, but we're preparing for war now."

"That's just it, Bill. The railways are not only going to have to move more traffic but they've got to get their tracks and structures in shape to move it without delay. And don't forget, too, that the public is demanding faster service everywhere for freight as well as passengers—and that requires better facilities."

"That's right."

"And, Bill, don't forget that these new training camps and munitions plants are going to require a lot of tracks and other railway facilities."

"I don't see why. They're all located along railways."

"That's true. But they're going to have to build more than a thousand miles of new tracks, maybe twice that amount, to service these government projects alone, to say nothing of the new trackage that will be required by private industries that have taken on war orders. Why, there's going to be more track built next year than in any year since 1929."

"Boss, you've certainly got the dope. It looks a lot better than I thought."

"A lot better, I'll say so. There'll be more railway materials bought in 1941 than in any year of the last ten."

"Is that so?"

"It certainly is. The railways will again be a 'billion dollar market' for the first time since 1929."

"Then I'm going out to get our share."

"I know you will, Bill, and we're going to back you up with advertising again—in fact, we're going to increase our space in Railway Engineering and Maintenance."

"Gee, that sure helps. That paper goes everywhere in our field. Why, when I was up on the Duluth, Missabe & Iron Range last week I found that everybody from chief engineer to foreman reads that paper. They have 32 subscriptions on that road of only 541 miles."

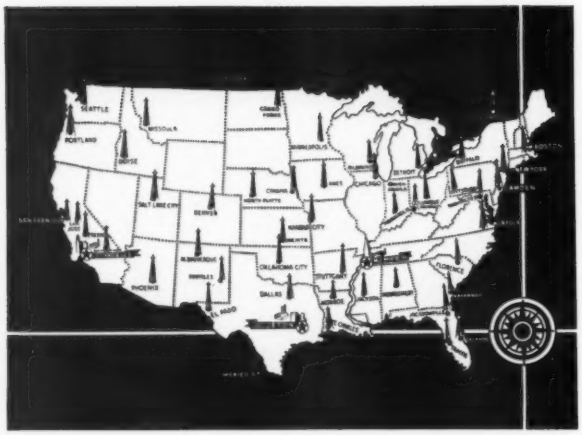
"Coverage like that shows that we're making no mistake. And success to you in 1941, Bill. I'm sure you'll have a great year."

★

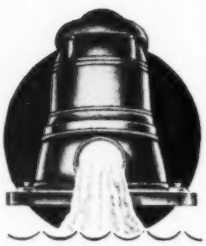
Railway Engineering and Maintenance Goes Every Month to the **Chief Engineer,** the 2 Roadmasters and All of the 29 Bridge and Building and Section Foremen on the Duluth, Missabe & Iron Range, Providing Complete Coverage Among System and Local Supervisory Maintenance Officers on This Vitally Important Carrier of Iron Ore.

★

RAILWAY ENGINEERING AND MAINTENANCE IS READ BY MAINTENANCE OFFICERS OF ALL RANKS



First
IN NATION-WIDE SERVICE



Layne service extends to the four quarters of the globe, but here in the United States it has reached its greatest efficiency. Dotted on the map from coast to coast and from border to border are Layne men and equipment ready to solve your water supply needs.

Expansion is the order of the day. Production must not lag. Never has the need for an adequate supply of water been more vital. Old wells may be reconditioned to step up their output. It might be necessary and more economical to install a completely new well water system. In either case, Layne engineers are ready to cooperate. Their experience is valuable. They will study your needs and make dependable recommendations. They will tell you facts about Layne Wells and Pumps—facts that are proven in world-wide service.

AFFILIATED COMPANIES

LAYNE-ARKANSAS CO. STUTTGART, ARK.
LAYNE-ATLANTIC CO. . . . NORFOLK, VA.
LAYNE-CENTRAL CO. . . MEMPHIS, TENN.
LAYNE-NORTHERN CO. . MISHAWAKA, IND.
LAYNE-LOUISIANA CO. LAKE CHARLES, LA.
LAYNE-NEW YORK CO. . NEW YORK CITY AND PITTSBURGH . . . . . PA.
LAYNE-NORTHWEST CO. MILWAUKEE, WIS.
LAYNE-OHIO CO. . . . COLUMBUS, OHIO
LAYNE-TEXAS CO. . . . HOUSTON AND DALLAS . . . . . TEXAS.
LAYNE-WESTERN CO. . KANSAS CITY, MO. CHICAGO, ILL. . . . OMAHA, NEBRASKA
LAYNE-WESTERN CO. OF MINNESOTA MINNEAPOLIS . . . . . MINN.
LAYNE-BOWLER NEW ENGLAND COMPANY. BOSTON . . . . . MASSACHUSETTS.
INTERNATIONAL WATER SUPPLY, LTD.. LONDON . . . . . ONTARIO, CANADA

Write if you want a Layne representative to call. A complete file of catalogs, bulletins and folders may be had without obligation. Address

LAYNE & BOWLER, INC.
Dept. S, Memphis, Tenn.

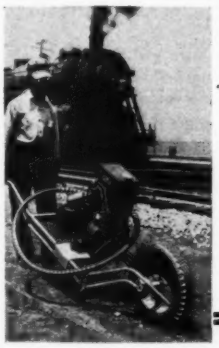
LAYNE

PUMPS & WELL WATER SYSTEMS

For Municipalities, Industries, Railroads, Mines and Irrigation

KEEP DEFENSE LOADS ROLLING AT LOW COST with ★ Mall TRADE MARK

MULTIPLE-DUTY MAINTENANCE AND CONSTRUCTION UNIT



5 H.P. EASILY PORTABLE GASOLINE POWERED UNIT

•

CUTTING 12" x 12" TRESTLE TIMBERS WITH CHAIN SAW

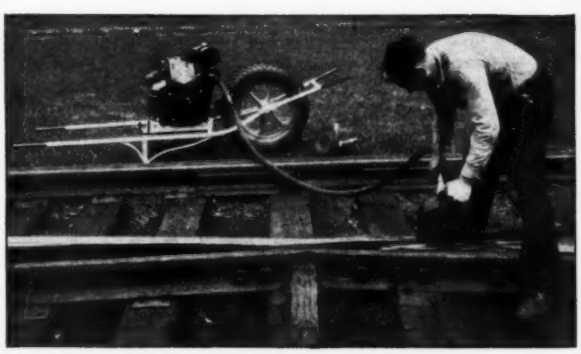
Every "right-of-way" can be geared to handle emergency schedules with this efficient multiple-duty MALL Portable Unit that saves time, power, labor and material. The interchangeable attachment feature on the flexible shaft makes it readily adaptable for grinding, sawing with circular or chain saw, sanding, wire brushing, drilling in wood, brick and steel, concrete vibrating, concrete surfacing and pumping.

Write TODAY for illustrated circular on this unit and other MALL Portable power tools. We make over 200 different gasoline engine, air and electrically operated tools and attachments.

MALL TOOL COMPANY
RAILROAD DEPARTMENT
7746 SOUTH CHICAGO AVE. CHICAGO, ILL.
SALES OFFICES IN PRINCIPAL CITIES

Conserve Your Steel

• Rail is precious—and growing more so. Prolong track life economically by systematic grinding to remove corrugations, to repair battered rail ends, to rejuvenate switch points. Life preservers for rail are Railway Track-work Grinders. Fast, accurate, service-proven for on or off-the-track use. Many models are available to meet various requirements. Write for newest Data Bulletins.



Model P-22 Railway Track-work Grinder — one of many models.

Railway Track-work Co.
3132-48 East Thompson St., Philadelphia

Classified Advertisements

Use this section when seeking a new man, a new position, or when buying or selling secondhand equipment.

CLASSIFIED ADVERTISEMENTS, $10.00 an inch, one inch deep by three inches wide, an insertion.

EMPLOYMENT ADVERTISEMENTS, 10 cents a word a month, including address, minimum charge $2.00.

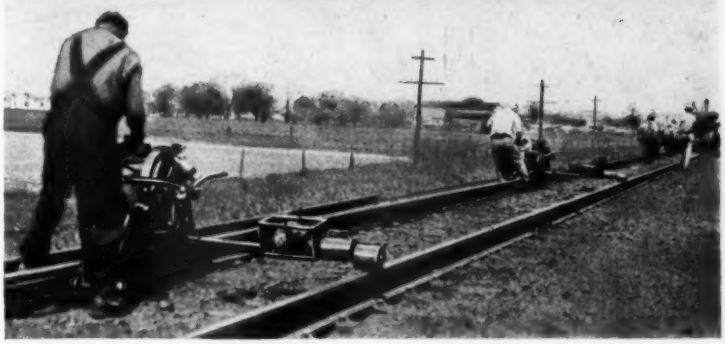
Remittance must accompany each order.

Railway Engineering and Maintenance
Classified Advertising Department
105 West Adams St., Chicago

ALPHABETICAL INDEX TO ADVERTISERS

NORDBERG POWER WRENCH *for periodic joint tightening and for use with the rail laying gang*

Above When used for periodical tightening, four-bolt joints can be tightened at the rate of 75 to 90 per hour.



Right On this rail laying job, one Nordberg Power Wrench was used at the head of the gang removing nuts from the old rail, and two behind the crane tightening the bolts on the new rail.

For normal joint maintenance or for removing nuts from old rail and tightening the bolts on newly laid rail, the Nordberg Power Wrench will do it faster and with a uniformity never possible with hand tightening. Uniform tension to every track bolt is assured by the adjustable spring loaded overload release. The wrench is full-revolving, permitting the operator to always work against traffic. While light in weight, sturdiness and dependability have not been sacrificed for light weight. With Power Wrench on the job, joints are tightened faster, life of rail is lengthened and smoother riding track is secured.

Nordberg Tools For Your Track Maintenance Jobs

TRACK WRENCH
ADZING MACHINE
SPIKE PULLER
POWER JACK
RAIL DRILL
UTILITY GRINDER
SURFACE GRINDER
PRECISION GRINDER
TRACK SHIFTER

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

Export Representative—WONHAM Inc.—44 Whitehall St., New York

Only a FLEX-TOE Can Pull Spikes Like This

MANUFACTURED BY MAKERS OF THE FAMOUS DEVIL LINE OF TRACK TOOLS

1. *A ONE MAN TOOL . . Pulls headless spikes and drift bolts.*
2. *No driving with spike maul or sledge. Injury from sheared edges of spike maul and flying spike heads reduced.*
3. *Moving gripper toes grasp and bite spike automatically and hold TIGHTLY.*
4. *Toes take tight hold anywhere along shaft of spike or bolt. Will not get under rail.*
5. *No shop redressing. Toes replaced for new ones in a few minutes, right on the job. Simple construction.*
6. *Use as old conventional claw bar. Easy to carry. Nothing new to learn.*

The Flex-Toe Claw Bar marks the first important development of principle and action in railroad hand tools since steel track first came into general use! This tool is a symbol of true progress—increases production per man, promotes safety, and does a better job. Two men can do the work of three. One man without a helper pulls spikes, even the throat-cut and headless ones. No spike maul driving is necessary.

Flex-Toe is thrown on the spike in the usual way and automatically the movable toes grab hold of any piece of protruding metal. By applying force in the usual way, the spike COMES OUT. There's nothing new to learn, but it works!

Write Today for Prices and Further Information

WARREN TOOL CORPORATION
WARREN, OHIO